Serving Tray & Stand • Lantern-Base Lamp • Hall Tree • Cutting Half Laps • Dado Blades

Woodsmith®

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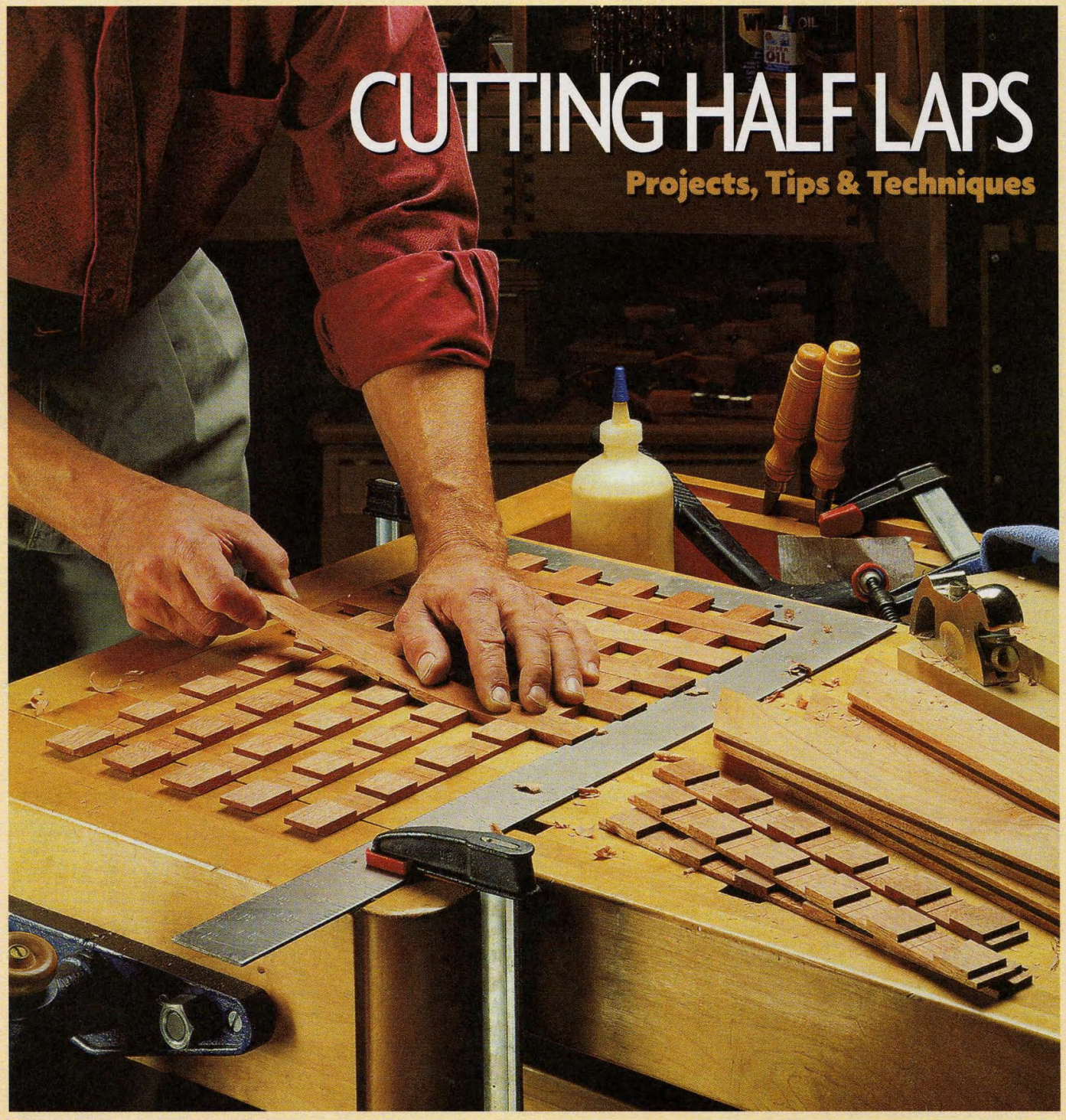

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EDITOR'S COLUMN

SAWDUST

Usually when we get together and start talking about the projects for an upcoming issue, one of the first things we discuss is how we want the project to look. We spend quite a bit of time making sure the proportions are right and all of the design details work well together.

Once the look of a project is finalized, we start talking about what type of joinery to use to get all the pieces to fit together.

But with two of the projects in this issue we took the opposite approach. We *started* with the joinery — half laps in this case. And then we designed the look of the projects.

HALF LAPS. Now I realize that by itself, a single half lap is probably not too interesting. After all, it's just a notch that fits into another notch in a mating workpiece.

Yet as simple as they are, half laps can have a dramatic effect on the appearance of a project. When you cut a series of half laps on a number of workpieces, they create a grid that turns an ordinary project into something special.

SERVING TRAY. The serving tray featured on page 6 is a perfect example. The bottom of this tray could have been a thin piece of plywood. Instead, we made it much more interesting by using thin strips of wood that appear to be woven together like a basket. But really, the strips are joined with half laps to create a strong, lightweight tray.

LAMP. The other project in this issue that features a half lap grid is the lantern-base lamp on page 16. This time, I didn't have to worry about making the grid strong. What I wanted was a delicate looking wood grid that wrapped around the top of the lamp base like an old-fashioned lantern.

But there's more to this project than a simple grid. What makes it really shine is the way it lights up. You can turn on a small bulb in the base for a soft, diffuse light. There's also a regular bulb for reading. Or you can use both at the same time. (We used a special type of turn-knob socket that allows you to operate two bulbs from the same switch.)

WEB PAGE. The last thing I'd like to mention is our Web page. If you've never seen it (or if it's been awhile since you've visited), check it out. We're always adding something new.

Currently, we have project plans and a database of projects and articles in *Woodsmith* and *ShopNotes*. Plus there's lots of woodworking tips, techniques and tool reviews. And recently, we added an online woodworking catalog. To see what's going on, point your browser to:

HTTP://WWW.WOODSMITH.COM

And while you're at it, send us an e-mail and give us some feedback. Or suggest some projects you'd like to see in *Woodsmith*. We're always glad to hear from you.

Terry

A LOOK INSIDE

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This little tray serves up some interesting woodworking. The grid in the center is created with half laps. And for the optional stand, you can try your hand at making a dowel to allow the legs of the stand to pivot. All in all it's a project that's sure to come in handy.

Cutting Half Laps 12

If you're looking for a good, solid "meat and potatoes" joint that can be made quickly, half laps may be just the ticket. Here, we walk you through the procedure for cutting half laps, along with some shop-tested tips for getting a perfect-fitting joint.

Lantern-Base Lamp 16

This lamp has an interesting design of half-lap grids on the sides. But the real surprise comes when you turn it on. A small bulb in the base of the lamp casts a lantern-like glow.

Hall Tree 22

Home is where you hang your hat. And this hall tree makes a great home for your hat (and your coat). Plus the interlocking design will keep your guests wondering how it was put together.

Dado Blades 28

Despite the name, dado blades do a lot more than just cut dadoes. Here are some helpful tips on how to select and use this important table saw "accessory."

Storage Contest Winners 32

The envelope please...the results are in for our shop storage contest. The winners include a cut-off rack, a wall storage system and a portable storage bin.

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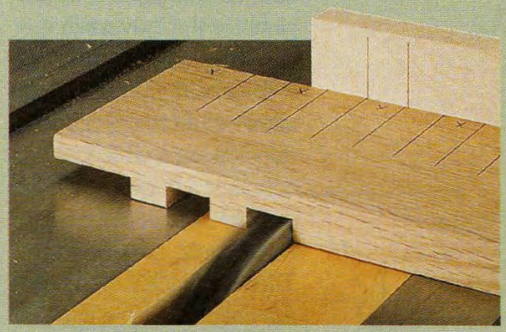
Serving Tray & Stand *page 6*



Cutting Half Laps *page 12*

Lamp *page 16*

Hall Tree
page 22

TIPS & TECHNIQUES

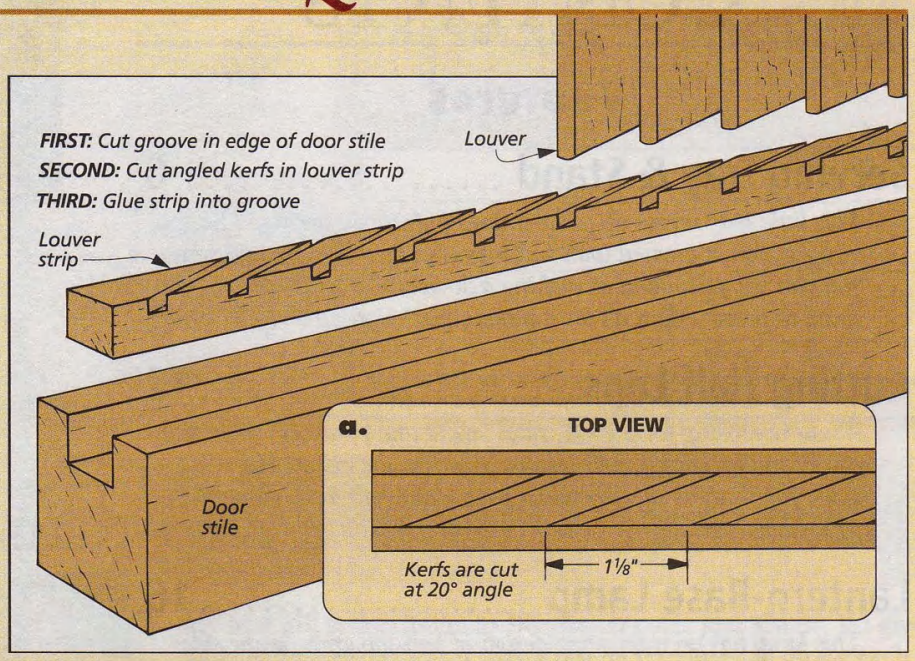
Louvered Doors

A while back, I was building a small wall cabinet that called for louvered doors. But instead of making a complicated jig to rout the slots for the louvers in the door stiles, I came up with a different method that allowed me to quickly cut the slots on a table saw.

I made a "louver strip" by cutting the slots on a separate blank, see drawing. Then the blank is glued into a groove cut on the edge of the door stile.

I cut the grooves in the edges of the door stiles first. This way, the louver strips can be sized to fit in the grooves perfectly after the slots are cut.

The slots can be made on the table saw by simply cutting a series of angled kerfs using the miter gauge, see detail 'a'. An auxiliary fence is attached to the face of the miter gauge to back up the blank while cutting the kerfs to prevent tearout.



Once the kerfs are all cut, the blanks can be ripped to width to fit in the grooves in the stiles. Then they are glued into the door stiles and sanded flush.

When it comes to making the louvers, just make sure to size the thickness of your louvers to match the width of the kerfs in the door stiles.

Tom Balph
Mesa, Arizona

Spindle Sander Jointer

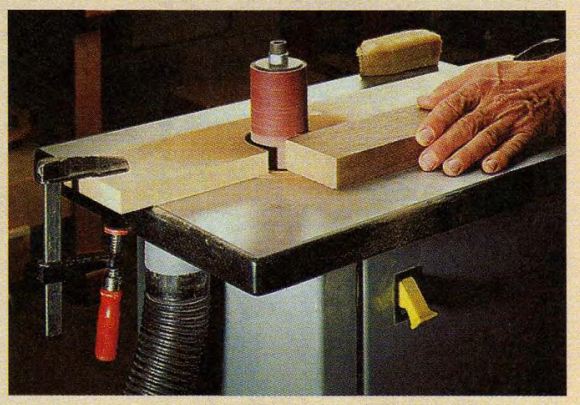
I don't have a jointer in my shop, so I came up with a way to use my oscillating spindle sander for jointing edges. I just made a simple "jointing" fence.

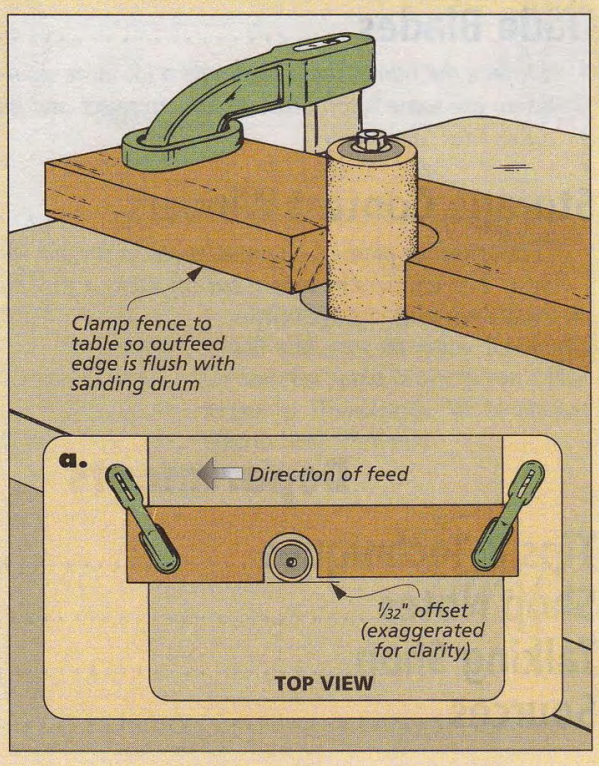
The fence is nothing more than a straight board with a U-shaped cut out to fit around the drum of my oscillating spindle sander.

Then to create an offset between the front and back of the fence, I shaved about 1/32" off the "infeed" side of the fence, see detail 'a'. (The deeper the cut, the slower you'll have to feed the workpiece.)

To use the fence, simply clamp it to the top of the sander so the drum is flush with the "outfeed" edge of the fence. Then all you have to do is feed boards along the fence past the sanding drum, see photo.

Carl Stanton
Linville, N. Carolina





Clamping Jig

I've always had a difficult time trying to use ordinary bar or pipe clamps to glue up small panels or frames. The size and weight of the clamps makes them unwieldy. So instead, I came up with a gluing and clamping jig that can be used for small projects.

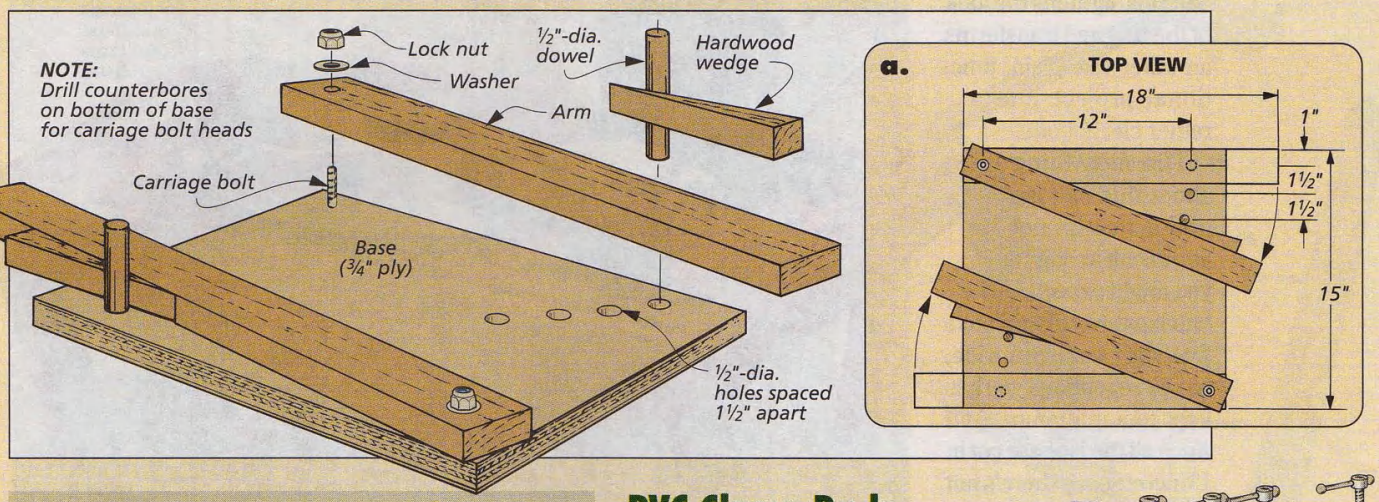
My jig uses a couple of pivoting arms to trap the workpieces. The arms equalize the pressure along the length of the edges being clamped. Clamping pressure is applied by using wedges and moveable dowel pins, see photo.

The base of the jig is just a piece of ¾"-thick plywood with some holes drilled in it. (I made my base 15" square). First, holes are drilled in two opposite corners for the hardware that is used to attach the arms. Then, a series of holes is drilled in an arc around each pivot hole. These are for the removable dowel pins that are added later.

Next, the two pivoting arms can be added to the base. The arms are nothing more than a couple pieces of ¾"-thick hardwood. They're attached to the base of the jig with carriage bolts, washers, and lock nuts, see drawing below. The lock nuts are not tightened down all the way in order to allow the arms to pivot freely.

A couple ½"-dia. hardwood dowels and wedges complete the clamping jig. By moving the dowels to a different set of holes, you can clamp up workpieces of various sizes.

Paul Murphy
Sydney, Nova Scotia



QUICK TIP

Instead of placing wax paper down on my bench when gluing up small pieces, I use a non-stick cookie sheet.

The cookie sheet doesn't slide around like the wax paper. And the lip around the cookie sheet keeps small pieces from rolling or "wandering off."

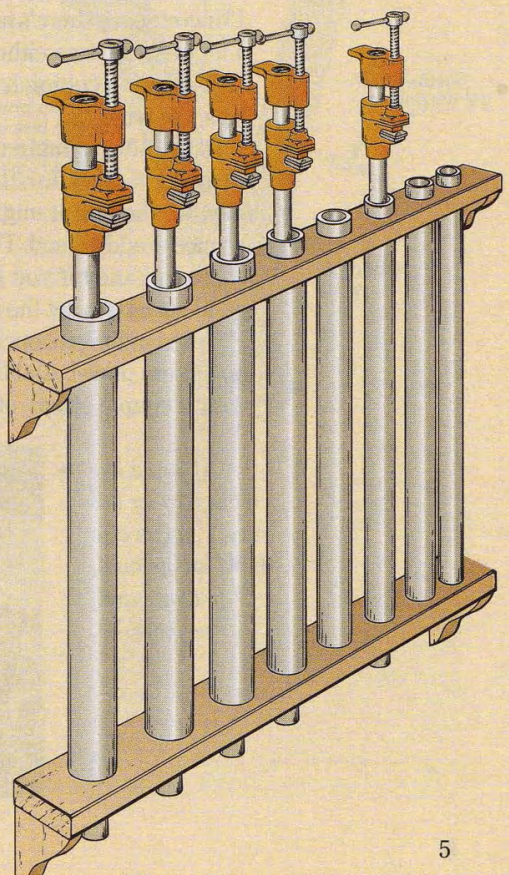
R. B. Himes
Vienna, Ohio

SUBMIT YOUR TIPS

If you would like to share an *original* shop-tested tip, send it to: *Woodsmith,* Tips and Techniques, 2200 Grand Avenue, Des Moines, Iowa 50312. Or if it's easier, FAX it to us at: 515-282-6741. Or use our E-Mail address: woodsmith@woodsmith.com.

Include a brief explanation and sketch or photo. If your tip is published, you'll receive $30 to $150, depending on the published length. And don't worry, we'll rewrite the tip and redraw the art, if necessary. Also, *please* include a daytime phone number.

PVC Clamp Rack



For a long time, I used a pipe clamp rack that consisted of a couple of rails, each with a row of holes. The problem I found with this type of rack was that I always had a hard time trying to slip the end of the clamp through the hole in the bottom rail. And some of my clamps were too short to even reach the holes in the bottom rail.

To solve this problem, I made a new clamp rack with PVC sleeves. I simply drilled oversize holes in both the top and bottom rails. Then I glued a length of PVC pipe in each pair of holes. Now I don't have any problem sliding the clamp right into its "holster."

Roger Boldt
Valders, Wisconsin

FEATURE PROJECT

SERVING TRAY & STAND

Like the weave of a basket, the grid in the center of this tray creates a light, elegant look. And building it is a matter of cutting a few simple half laps.

Figuring out why I think this serving tray is so attractive isn't too difficult. It's the grid in the center. This simple grid, built with half laps, lightens the look of the tray and transforms an otherwise plain, functional project into a rather elegant one.

The nice thing about this half lap grid is that it's not as difficult to build as you might expect. All the half laps are cut in blanks that start out extra wide, so the repetitious work is kept to a minimum. And since all the laps are cut in 1" increments, there's not a lot of setup time either. (For more on cutting half laps, see page 12.)

STAND. After coming up with the design for the tray, we thought it might be nice to add a stand. This stand can come in handy if you don't have a good surface to set the tray on.

Our stand pivots open and closed on a cross dowel. And it's held open with a couple straps of nylon webbing. But what's especially helpful is that the stand is sized to fit "into" the bottom of the tray. The sides of the tray form a lip around the bottom, so the tray sits securely on the stand.

WOOD SELECTION. There's one other thing I'd like to mention about this tray. With most projects, you can choose from a variety of woods and the project will still look just as nice.

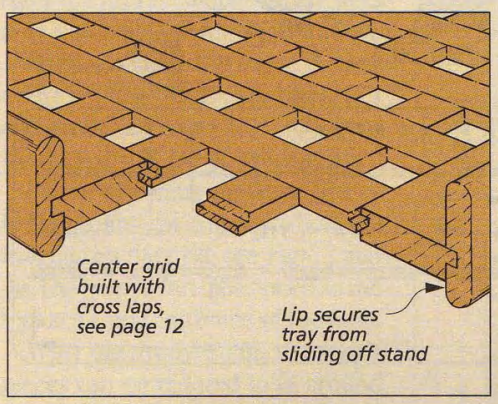
This is true here as well. You could build this project out of mahogany (like we did), cherry, maple, or walnut. However, you'll probably want to avoid wood that has wild or pronounced grain (like oak or ash). It would tend to compete with the straight lines of the grid. So stick to a wood that has little grain pattern or one that has a straight grain pattern.

Of course, you're going to need a straight 1"-dia. dowel in whatever wood you choose. And we found it easiest to make our own, see page 30.

If you'd like a place to set this tray, you can also build an optional, folding stand, see page 10.

Construction Details

OVERALL DIMENSIONS:
31¼"H x 21¼"W x 15¼"D

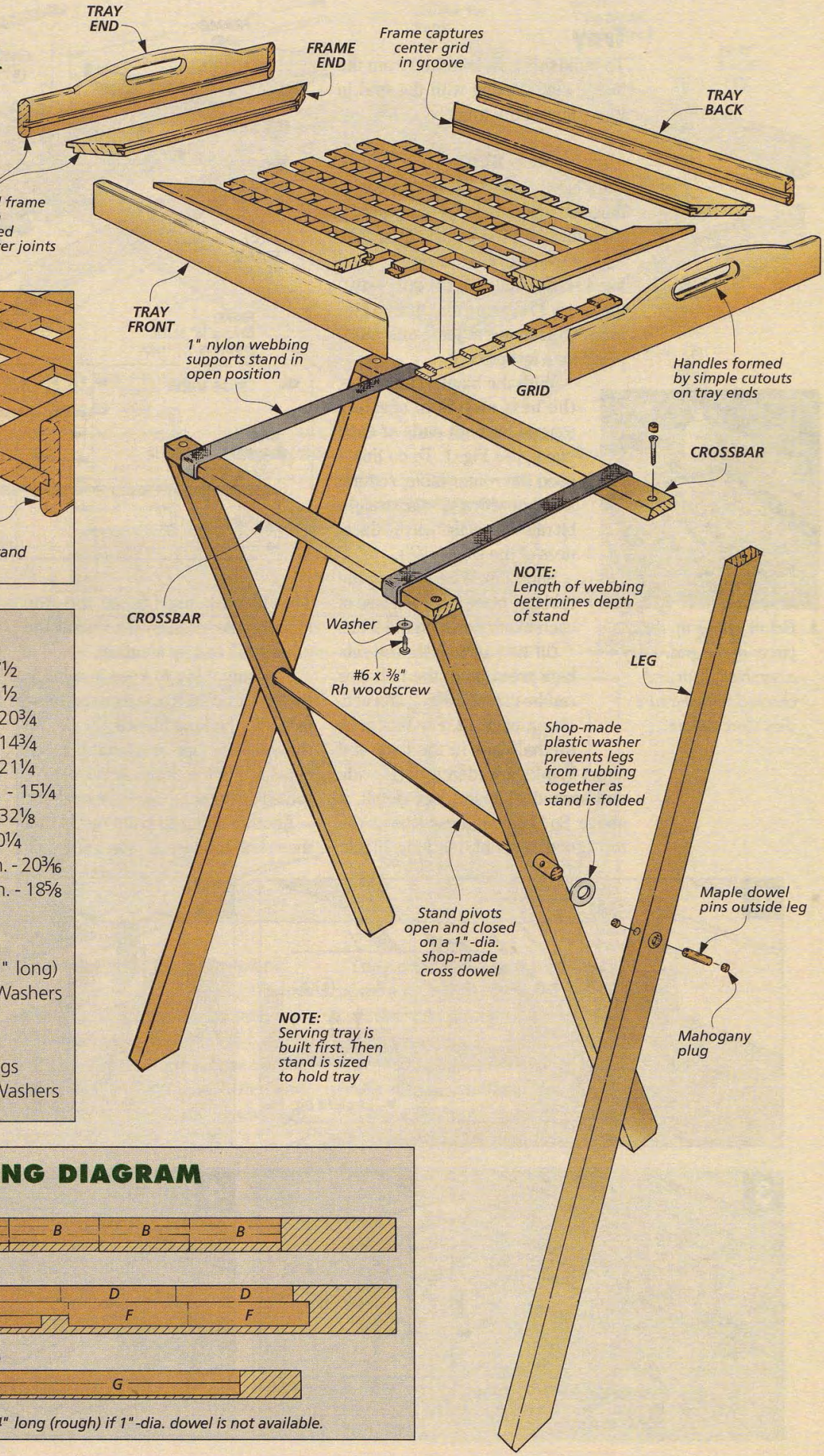


MATERIALS

A	Grid (Long) (5)	¼ x 1 - 17½
B	Grid (Short) (8)	¼ x 1 - 11½
C	Frame Front/Back (2)	½ x 1⅞ - 20¾
D	Frame Ends (2)	½ x 1⅞ - 14¾
E	Tray Front/Back (2)	½ x 1¾ - 21¼
F	Tray Ends (2)	½ x 3 rgh. - 15¼
G	Legs (4)	¾ x 1½ - 32⅛
H	Cross Dowel (1)	1-dia. x 20¼
I	Crossbar (Long) (1)	½ x 1¾ rgh. - 20 3/16
J	Crossbar (Short) (1)	½ x 1¾ rgh. - 18⅝

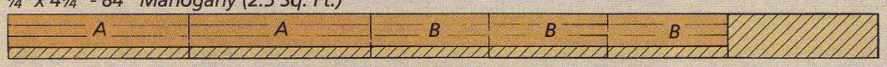
SUPPLIES

- (1) 1"-wide Nylon Webbing (48" long)
- (4) #6 x ⅜" Rh Woodscrews w/Washers
- (4) #4 x 1¼" Fh Woodscrews
- (2) ¼"-dia. x 1" Dowel Pins
- (2) ¼"-dia. x ¼" Mahogany Plugs
- (2) ¾" I.D. Shop-made Plastic Washers

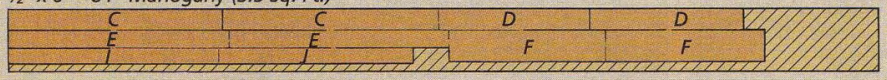


CUTTING DIAGRAM

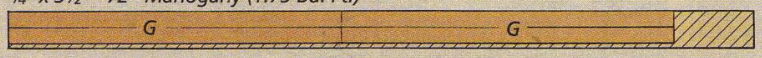
¼" x 4¼" - 84" Mahogany (2.5 Sq. Ft.)



½" x 6" - 84" Mahogany (3.5 Sq. Ft.)



¾" x 3½" - 72" Mahogany (1.75 Bd. Ft.)



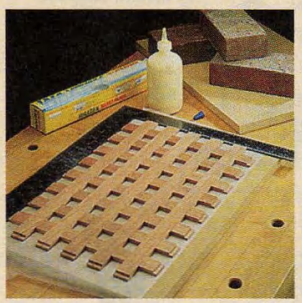
NOTE: *Also need a piece of 5/4 stock 24" long (rough) if 1"-dia. dowel is not available.*

Tray

To build this tray, I worked from the inside out, starting with the grid in the center of the tray.

GRID

Building the 1/4"-thick grid is easier than you might expect. For one thing, the individual pieces start out as wide blanks, refer to Figs. 1 and 2. I cut five 4"-wide blanks for the grid — two that were 17½" long and three 11½" long. (But make at least one more blank for a test piece.)

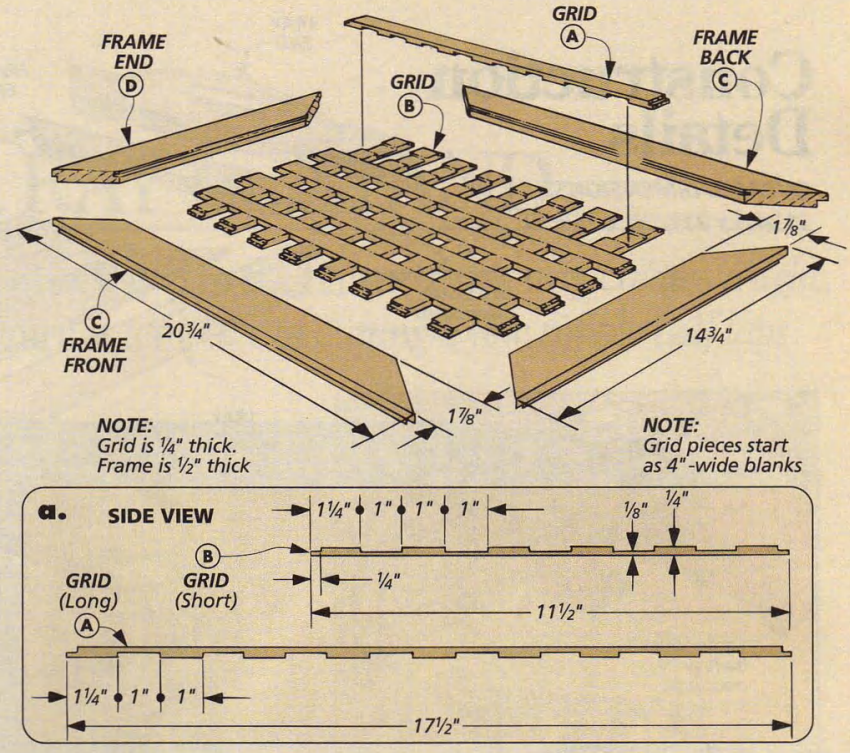


▲ *Before gluing up the pieces of the grid, I dry assembled them and checked to make sure they were square.*

With the blanks cut to size, the next step is to create a tongue on both ends of each blank, see Fig. 1. To do this, I used the router table, routing a rabbet with a 3/4"-dia. straight bit raised exactly half the thickness of the stock (1/8").

Shop Tip: When cutting the rabbets, place the good face of each blank down on the table.

CUT HALF LAPS. After the rabbets are routed, the half laps can be cut, see Fig. 2 and article on page 12. For this grid, the half laps in the long and short blanks are identical (1" wide and spaced 1" apart), see detail 'a' above. So I laid out these laps on the top (good) face of one long blank.



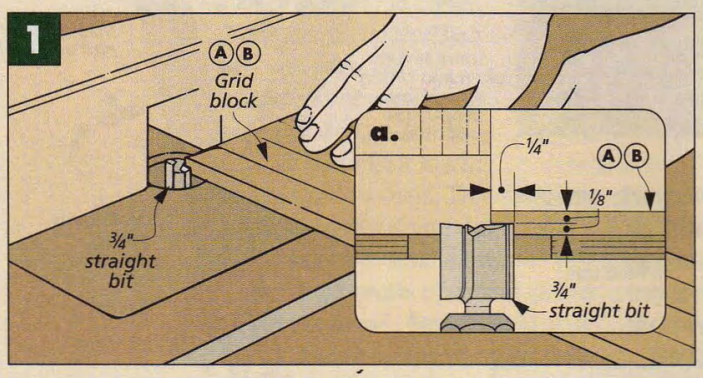
This blank is used to set the stop block on the auxiliary fence so all the others will end up identical.

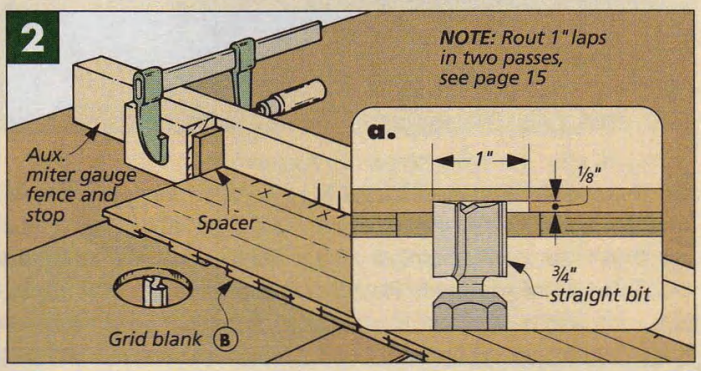
The only thing to keep in mind is the laps aren't all routed on the same face. On the long blanks, they're on the *opposite* face as the rabbet, see detail 'a.' For the short blanks, they're routed on the *same* face as the rabbet.

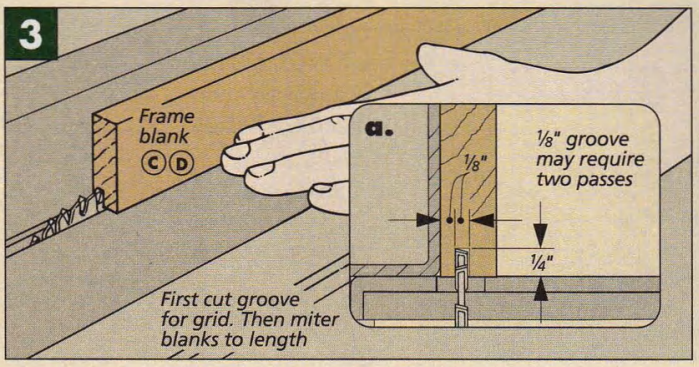
Another thing to point out is that these half laps are 1" wide. So you'll need to make two passes over the bit for each. But you don't have to reset the fence. For the second pass, I placed a 1/4" spacer between the blank and the stop, refer to page 15.

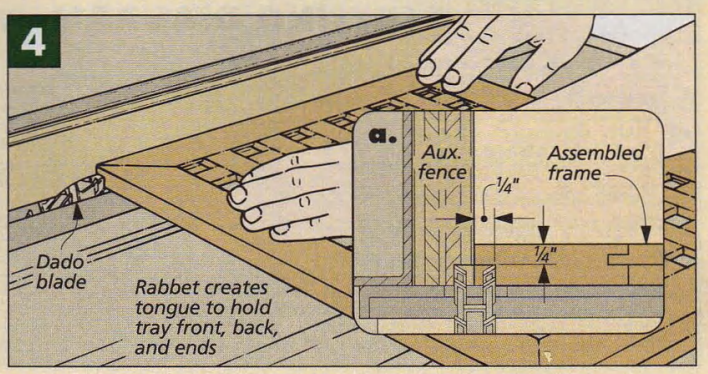
RIP TO WIDTH. After the half laps are cut on the blanks, the individual **grid pieces (A, B)** can be cut to final width to fit into the half laps.

ASSEMBLY. At this point, the grid can be assembled. First I dry assembled









the pieces (good face down), using a framing square to make sure the assembly was square, see photo in left margin. Then I removed each short piece, applied *a drop* of glue to the laps, and replaced it. And to keep the assembly flat, I placed a piece of plywood and a heavy weight on it.

FRAME, SIDES & HANDLES

After the grid is completed, the next step is to build the frame around it.

FRAME. To make the frame, I started by ripping the **front, back (C)** and **ends (D)** to width (1⅞") from ½"-thick stock, see drawing at left.

But before mitering these pieces to length, first cut grooves to hold the tongues on the grid, see Figs. 3 and 3a. The grooves are positioned so the tops of the grid and frame will be flush.

With the grooves cut, the frame pieces can be mitered to fit around the grid, see drawing at left. To find the lengths of these pieces, I measured from shoulder-to-shoulder on the grid pieces. Then the frame can be glued around the grid.

Now before making the front, back and ends of the tray, cut a rabbet along the bottom edge of the frame to create a ¼" x ¼" tongue, see Fig. 4.

TRAY FRONT, BACK & ENDS. The front, back and ends of the tray wrap around the frame. I started by ripping ½"-thick blanks to width, see drawing above. The **tray front** and **back (E)** are 1¾" wide (tall), but the **ends (F)** are 3" to allow for the handles.

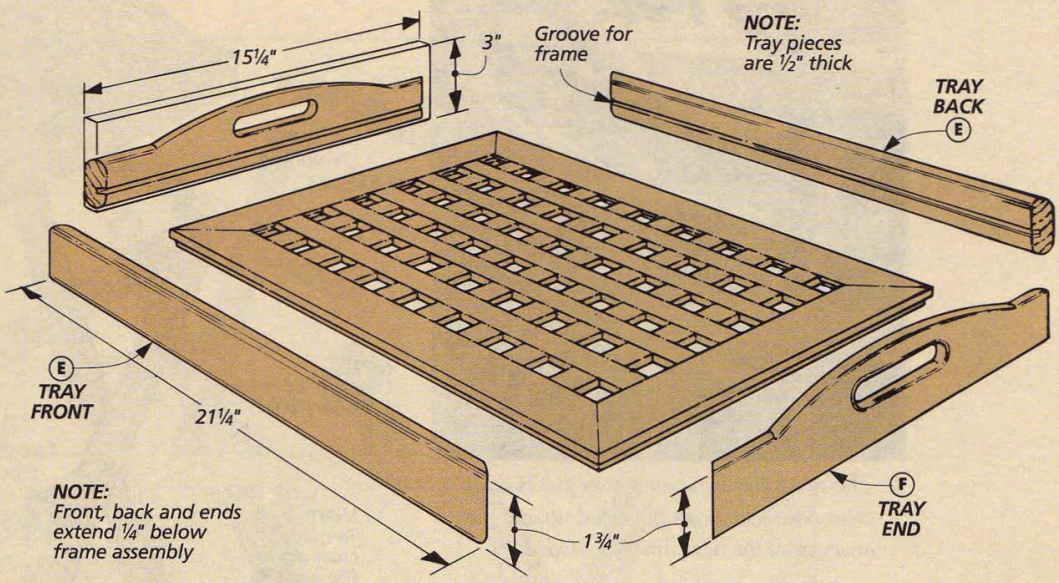
Next to hold the tongues on the frame, I cut ¼" x ¼" grooves ½" from the bottom of each piece, see Fig. 5.

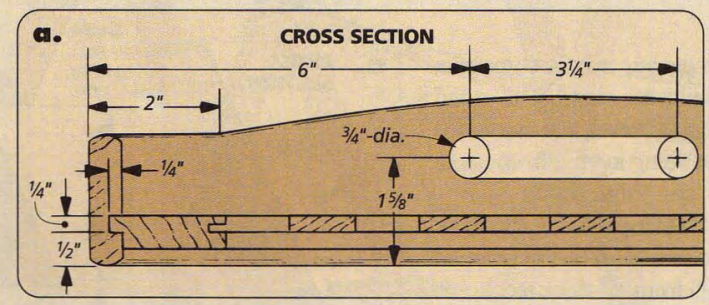
With the grooves cut, the front, back and ends can be mitered to wrap around the frame, see drawing. But before you can glue them in place, there are couple things to do first.

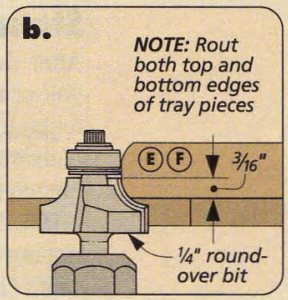
First, I cut the curve along the top of each end piece (F) and sanded it smooth, see detail 'a' and Fig. 6. Then I created the opening for the handle by drilling two ¾"-dia. holes and removing the waste between them with a sabre saw, see detail 'a.'

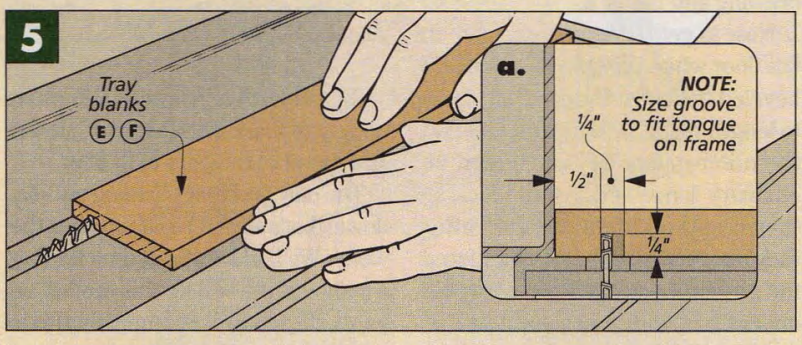
The next thing to do is round over the top and bottom edges of the front, back and end pieces (including the handle opening), see detail 'b.'

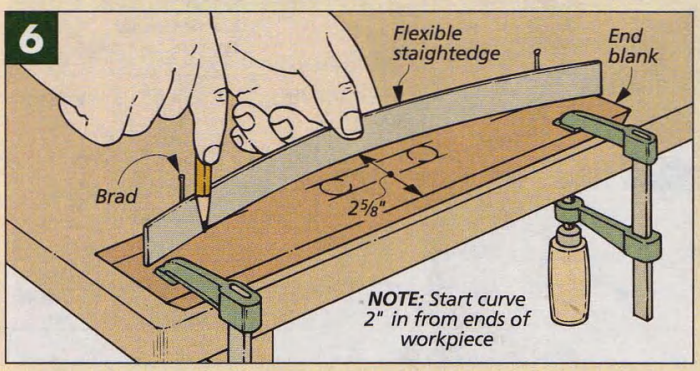
Now all that's left is to glue the tray pieces around the frame, see Fig. 7. Just make sure you center the clamping pressure on the frame.

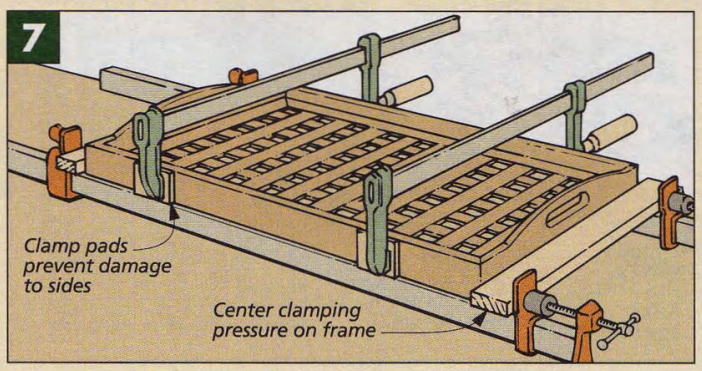




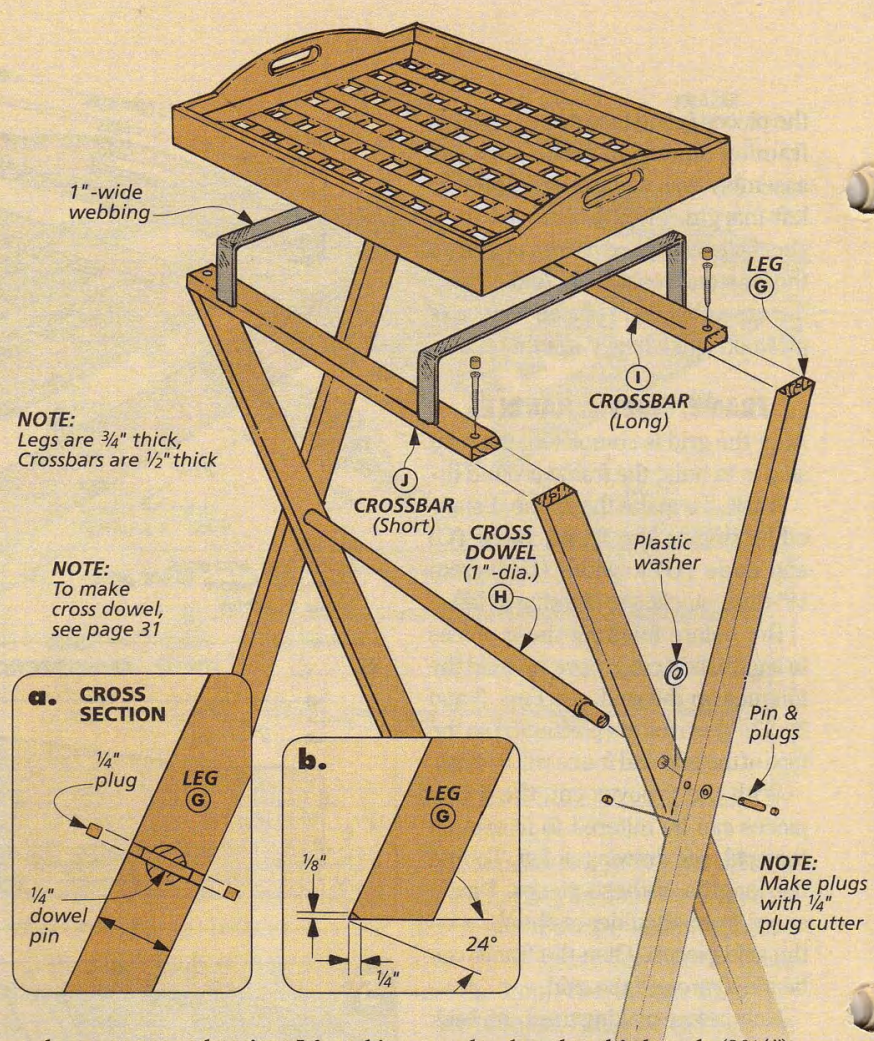








▲ *The stand for the serving tray pivots on a cross dowel so it can be folded up and put away until the next time it's needed.*



Stand

After the serving tray is complete, you can build the stand. The stand folds on a cross dowel, and two straps of nylon webbing keep it from opening too far, see photo above.

LEGS. To build the stand, I started by ripping the four **legs (G)** to finished width (1½") from ¾"-thick stock, see drawing and detail 'a.'

Now to get the legs to rest flat on the floor when the stand is opened, I beveled the ends while cutting them to length (32⅛"). To do this, I angled the miter gauge 24° and added an auxiliary fence and a stop block so they'd end up identical. And after they're cut to size, I also chamfered the bottom tip of the leg so it would not catch on the carpet, see detail 'b.'

All that's left to complete the legs is to drill a ¾"-dia. hole at the center of each leg to hold the tenon on the dowel, see Fig. 8.

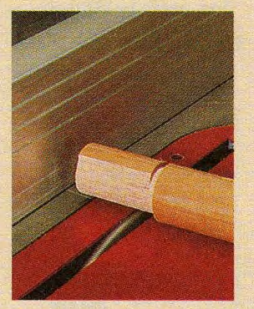
CROSS DOWEL. With the legs cut out, it's time to connect them — with crossbars at the top and a cross dowel at the center, see drawing. I found it easiest to start with the cross dowel and then cut the bars to fit later.

The only problem is finding a 1"-dia. dowel that's straight *and* matches the wood. We had a difficult time finding a mahogany dowel for this project, so we made our own. Fortunately, this is a simple procedure. All you need is a ½" round-over bit and an auxiliary extension for your router table. For more on this technique, see page 30.

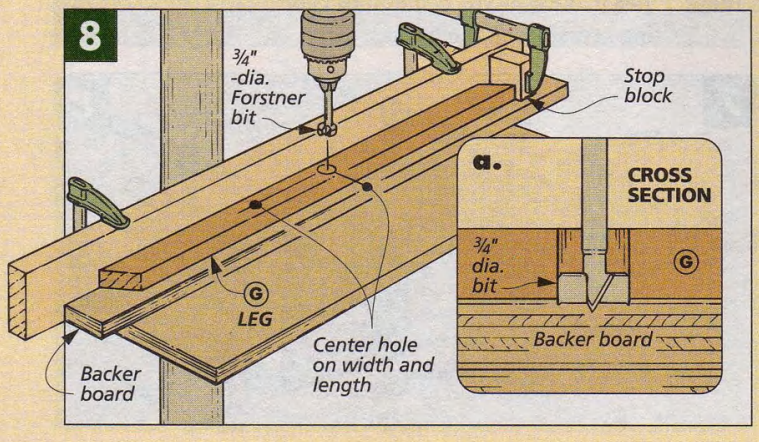
Cutting the **cross dowel (H)** to size is easy. I simply measured between the handles on the tray and cut the dowel to this length (20¼").

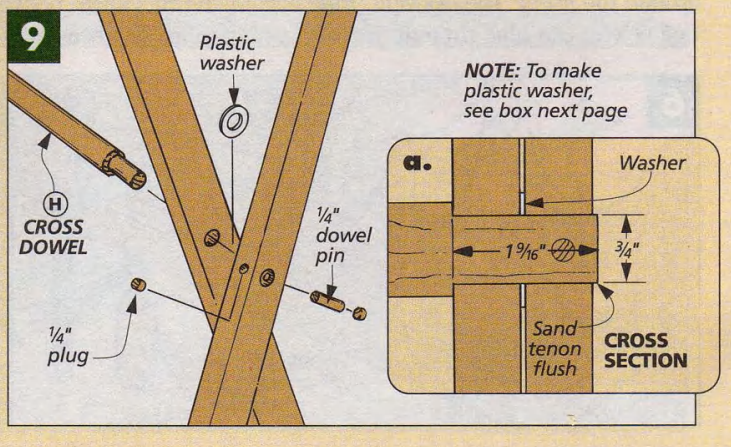
Next, I cut a ¾" dia. tenon on each end of the dowel, see Figs. 9 and 9a. Cutting tenons on a dowel is no problem; I typically use my table saw, see photo in margin and page 30. But figuring out the length of the tenon on each end is a bit more work.

Each tenon on the cross dowel should match the thickness of the two legs (1½") with a 1/32" gap between the stand and the tray. But I didn't want the legs to rub against each other and wear away the finish, so I added a shop-made plastic wash-



▲ *I cut a tenon on the end of a dowel with a table saw. Refer to this simple technique on page 30.*





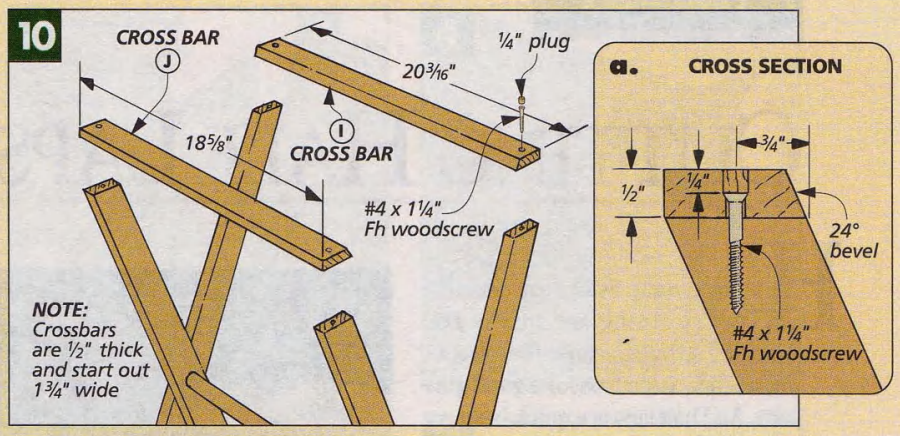
er (1/32"-thick) between them, see box below. Adding up the legs and washer and allowing for the gap between the tray and stand, my tenons ended up 1 9/16" long, see Fig. 9a. Note that when the tenons are cut to this length, they will stick out roughly 1/32". This excess can be quickly sanded off.

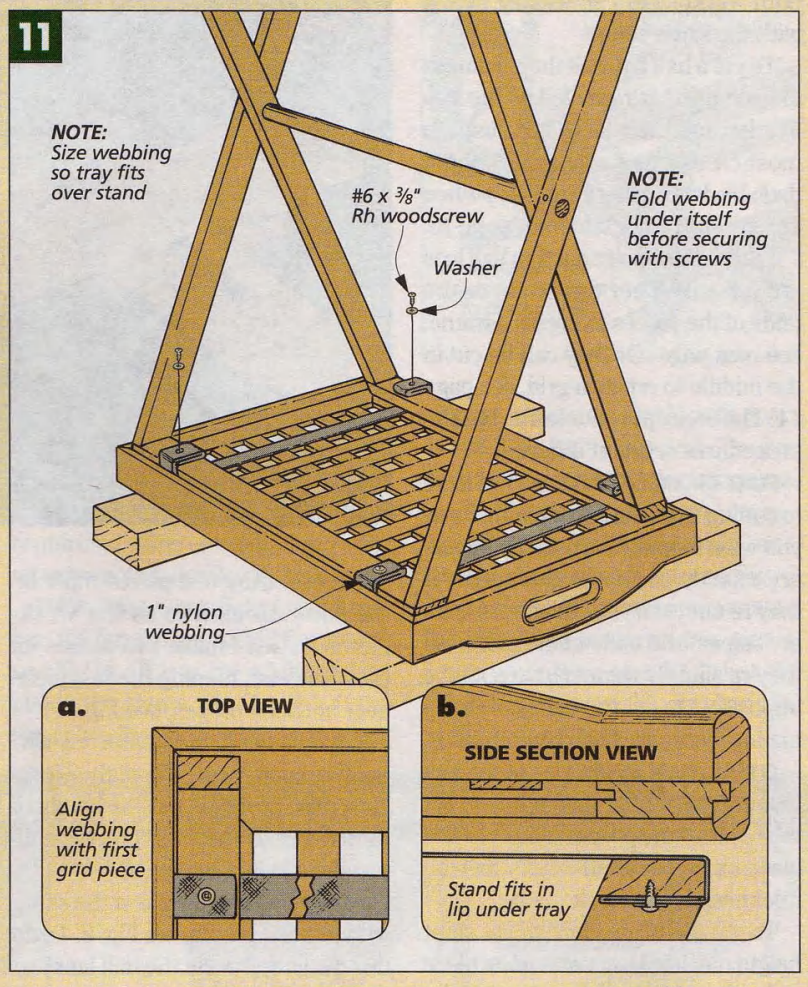
After the tenons are cut, the legs are ready to be attached to the cross dowel, see Figs. 9 and 9a. Again, it was hard to find a 1/4"-dia. mahogany dowel to pin the outside legs. So instead, I used a 1"-long maple dowel, see detail 'a' in drawing on page 10. Then I filled the holes with 1/4"-long plugs. (I used a plug cutter.)

CROSSBARS. Now, the tops of the legs can be connected with 1/2"-thick **crossbars (I, J)**, see Fig. 10. The inside edge of these pieces is beveled 24° to match the angle of the legs. And they are cut to length to span across the legs. (My long crossbar was 20 3/16"; the short one was 18 5/8".)

WEBBING. After the crossbars were screwed to the legs, I added the 1"-wide nylon webbing that prevents the legs from opening too far. I aligned the webbing with the first grid piece near each end. And to make sure the webbing was the right length, I flipped the tray upside down and set the stand upside down inside the tray, see Fig. 11. This way, when I screwed the webbing to the crossbars, it would end up the exact length needed.

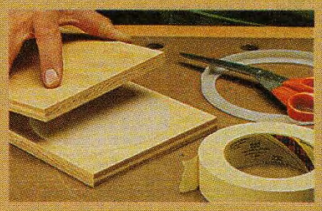
FINISH. Finishing the stand is easy. The tray with its grid is a little more difficult. So instead of trying to wipe or brush the finish in the grid openings, I found it easier to spray on a couple coats of finish. (I used Deft spray-on lacquer.)





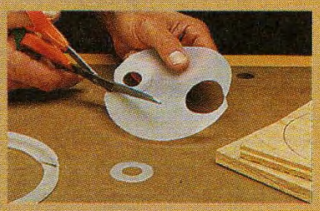
SHOP-MADE PLASTIC WASHERS

To keep the legs from rubbing together and wearing off the finish, I added a plastic washer between them. But after a trip to a couple hardware stores, I decided it would be much easier just to make my own. Any thin piece of plastic will work. (I happened to use a coffee can lid.)



Sandwich plastic. *First, sandwich a coffee can lid between two pieces of plywood.*

Drill holes. *Next drill 3/4"-dia. holes to match the size of the tenon on the cross dowel.*



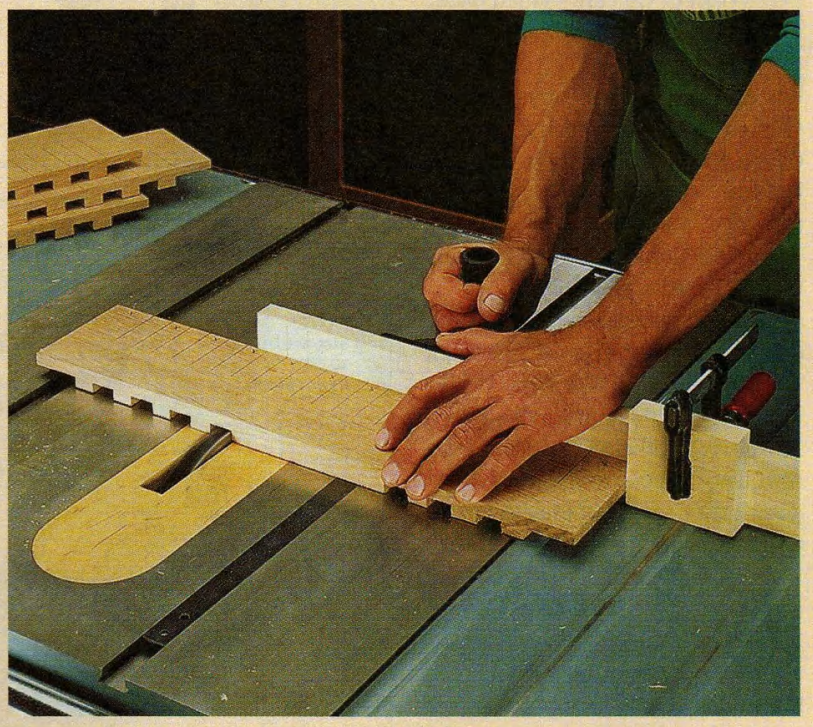
Cut out washers. *Finally, draw two 1 1/4"-dia. circles and cut them out with scissors.*

CUTTING HALF LAPS

Half laps have two great benefits: They're strong and quick. The joints are strong because there's a lot of face-to-face surface for a good glue joint. And half laps are quick because both workpieces can usually be cut with the same setup.

To cut a half lap, half the thickness of each piece is removed so the two overlap and their faces are flush. In most cases I use a table saw and a dado blade. But there are times when I prefer the router table, see page 15.

I should also point out that half laps are versatile. They can be cut on the ends of the pieces to create a frame, see next page. Or they can be cut in the middle to create a grid, see page 14. The concept is the same, but the procedures are a bit different.



EXACT THICKNESS. There are two keys to cutting a half lap successfully. First, you want to make sure all the blanks are exactly the same thickness. If they're not (or if your thickness planer "snipes" the ends of the pieces so they're slightly thinner), then it'll be impossible to cut the half laps so the mating pieces are flush on both faces.

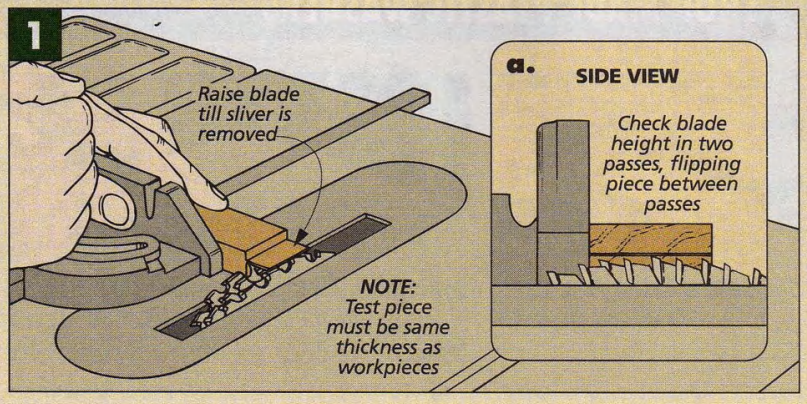
CAREFUL BLADE SETUP. The other key to cutting accurate half laps is to set the blade to the proper height — the blade has to be raised exactly half the thickness of the stock.

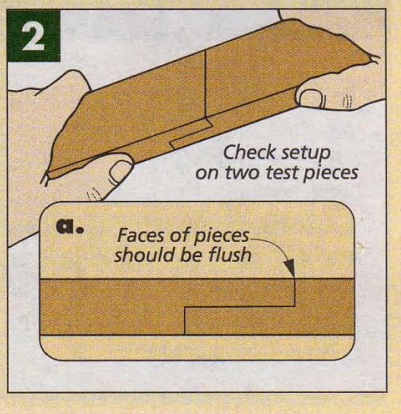
To get the blade close to the right height quickly, I start with a test piece and set the blade just *under* half the thickness. (Any test pieces must be the same thickness as the workpieces.) Then I make two passes on the same end, flipping the test piece over between passes, see Fig. 1.

What you end up with is a tiny sliver of wood at the center of the piece. Now raise the blade half the height of the sliver and repeat this process until the sliver is just removed.

Now you're ready to test the setup with two test pieces, see Fig. 2. To do this, you need to cut the half laps just like you will on the good workpieces, refer to Figs. 4 and 5. If there's a small shoulder, you'll need to adjust the blade up or down depending on whether the lap is too deep or shallow.

Be patient here. If the half laps are a off now, they're sure to be off later. So take the time to get the setup perfect. And one more thing. It's important to be as consistent as possible when cutting the half laps (applying the same downward pressure on all pieces, for instance). Otherwise, you can end up with half laps that are slightly different.





End Laps

Whenever you need to create a quick, strong frame, end laps are a good choice. I typically use my table saw, making multiple passes over a dado blade, refer to Fig. 4. And to support the workpieces, I use an auxiliary fence attached to the miter gauge.

FENCE SETUP. The first step to cutting end laps is to get your dado blade set to the right height, see previous page. Once that's done, all that's left is to set up a stop to establish the width of the cut. Most times, I use my rip fence as a stop. I set it so the width from the *outside* of the dado blade to the fence equals the width of the workpieces, see Fig. 3. (For more on using the rip fence as a stop, see page 14.)

MULTIPLE PASSES. Now the laps can be cut on both ends of each piece, see Fig. 4. Usually the workpieces are wider than the dado blade, so you have to make multiple passes.To do this, simply cut the shoulder pass and then slide the piece away from the fence and make another pass until all the waste is removed.

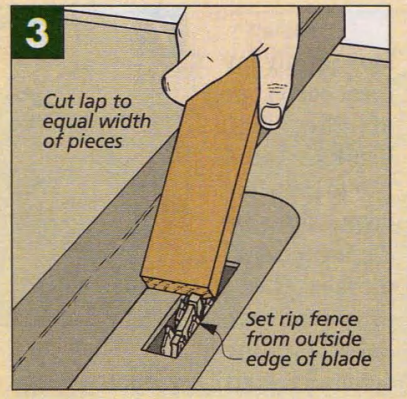
CLEANING THE CHEEKS. With some dado blades, these passes will leave tiny grooves along the cheeks of the half lap, see Fig. 5a. These tiny grooves are going to show, but you can remove them in one of two ways.

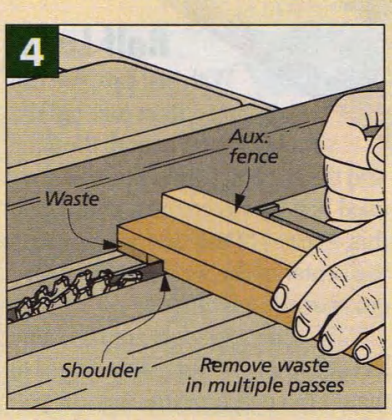
One way to remove most of these grooves is to push the piece over the blade slowly while moving it side-to-side, see Fig. 5. (It's like patting your head while rubbing your stomach.)

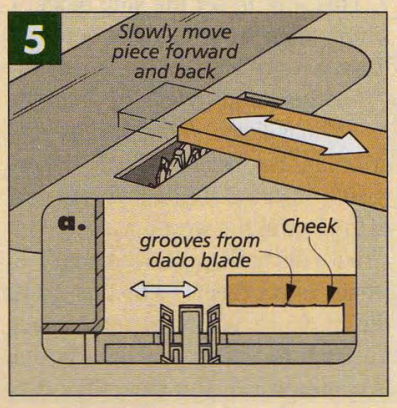
The other method you can use will create cleaner half lap cheeks, but it requires a different technique with an extra setup, see box below.

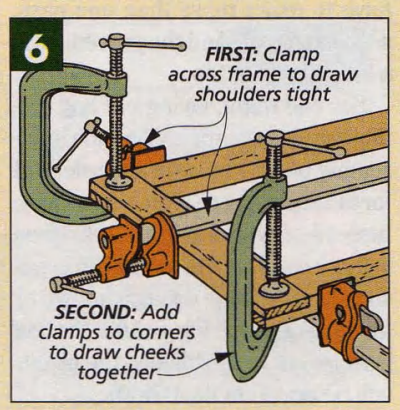
SETUP. After some light finish sanding, it's time to assemble the frame, see Fig. 6. (If you are adding a grid inside the frame, you'll need to cut the cross laps first.) End laps aren't quite as easy to assemble as they are to cut. This isn't a big deal. You just have to be careful that the frame goes together square without any gaps.

End laps require clamping pressure in three directions, see Fig. 6. First I clamp the workpieces against the shoulders of the mating pieces. Then when I've checked that the assembly is square, I'll add clamps at each corner too.







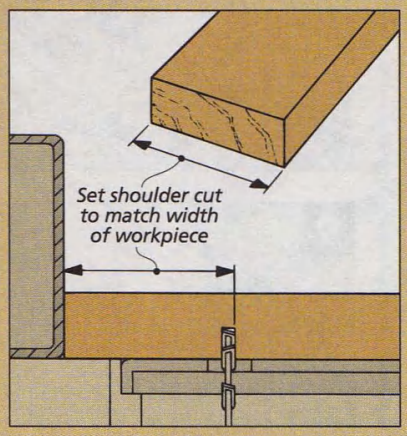


CUTTING END LAPS WITH A JIG

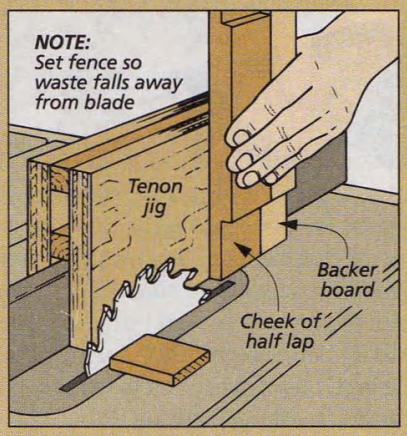
There's another way to cut end laps, and it's even cleaner than when making them in multiple passes. The only drawbacks are that this method requires two setups (and a tenon jig) and you can't use it to cut cross laps.

To cut a half lap with this method, first you establish the shoulder of the lap. This setup is basically the same as the multiple pass method, except this time you use a regular blade instead of a dado blade.

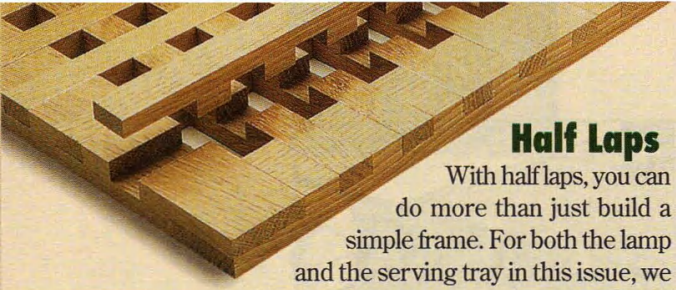
After the shoulder's cut, I use a tenon jig to cut the cheek, sneaking up on the final cut until it's exactly half the thickness of the piece.



***Shoulder cut**. First, cut the shoulder, setting the fence so the outside of the blade matches the width of the piece.*



***Cheek cut**. Next, using a tenon jig, cut the cheek of the half lap, sneaking up on the final thickness of the cut.*



Half Laps

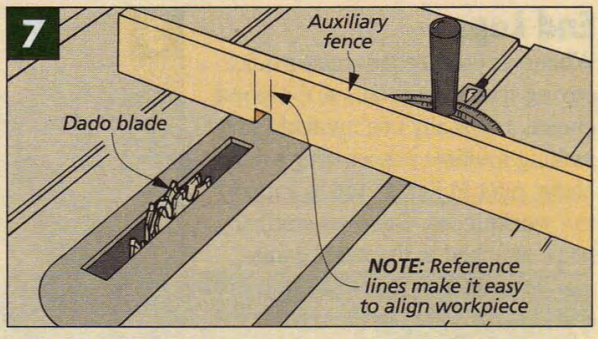
With half laps, you can do more than just build a simple frame. For both the lamp and the serving tray in this issue, we used half laps to create a grid. To do this, a series of half laps are cut along the center of the workpieces so they cross over each other.

To do this, the tools are the same as with end laps, but the dado has to match the width of the laps (or you have to make more than one pass, see next page). And the procedure is a little different too.

For one thing, laying out and cutting the laps accurately on each intersecting piece would be a hassle. But fortunately, there's an easier way. Instead of working with individual workpieces, I cut the half laps in extra-wide blanks (wide enough for two or three pieces), see Fig. 8. After the half laps are cut in the blanks, the pieces will be ripped to final width.

Note: If there's a frame that surrounds the grid, you can cut these pieces to finished width and cut the end laps on them first, see the photo above and page 13.

When the blanks are planed and sanded to final thickness, the next step is to lay out the half laps. Because I use a stop block when cutting the laps, I only lay them out on one of the long blanks. And I like to draw the layout lines on the face *opposite* the laps. Then I draw reference lines for the notch on the auxiliary fence, see Fig. 7. This way, to set the stop block, I simply align the layout lines between the reference lines on the fence.



Another good layout tip is to mark an "X" to indicate where the half laps are to be cut, refer to Fig. 8. Otherwise, you could accidentally cut one of the laps in the wrong place.

With the half laps laid out, the next step is to cut them. To do this, I use the rip fence as a stop. You can set the fence for each lap, or if the layout is symmetrical, you can make two passes with each setting, flipping the piece end-for-end. (This will cut the number of setups in half.)

Note: If the half laps are wider than the dado blade, you'll need to make more than one pass, see next page.

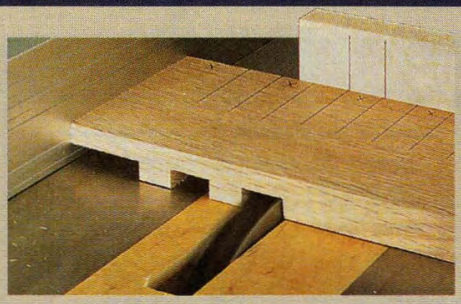
After the laps are cut, the blanks can be ripped into individual pieces, see Fig. 9. But before doing this, it's a good idea to mark one end of each blank. This way when it's time to assemble the grid, you can make sure the pieces are oriented the same.

When ripping the blanks, the key is to size the individual pieces so they fit snug in the half laps, see Fig. 9a. You can use a test piece to do this or rip your first workpiece a hair wide and sneak up on its final width.

When all the pieces have been cut to size, the last thing to do is assemble the grid. To do this, I typically dry assemble the grid to test the fit of the pieces. Shop Tip: To check that the assembly is square, use a framing square. Then to glue the grid together, I remove one piece at a time and add *a drop* of glue to each lap.

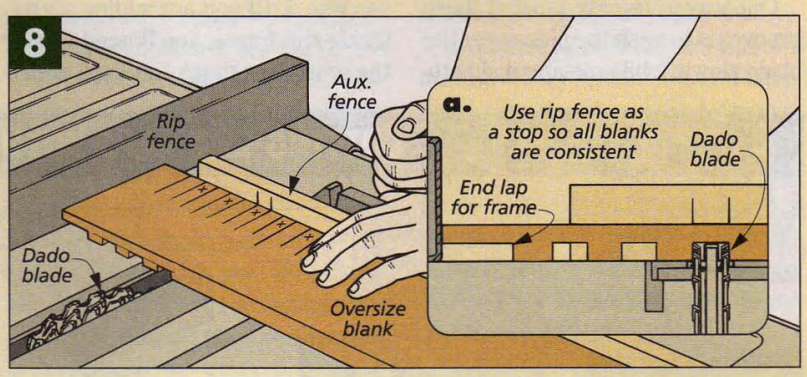
After the pieces are glued in place, I keep the assembly flat by setting a piece of plywood and some weight on top, refer to photo on page 8.

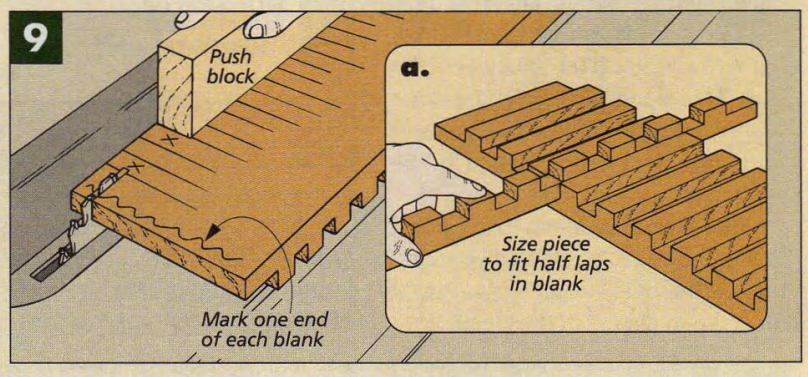
RIP FENCE AS A STOP



Occasionally, we'll get a letter warning us about the danger of using the rip fence as a stop when pushing a piece with the miter gauge. The danger is that the cut-off piece can kick back at you. And we agree. You should *never* cut completely through a piece using both the rip fence and miter gauge.

The key word is "completely." And when cutting half laps, you're not cutting completely through the workpiece, so there's no cutoff piece to kick back at you.





Wide Half Laps

Sometimes, a project will require a half lap that's wider than your dado blade set. (This was the case with the serving tray grid, see page 6.) This means you have to cut the laps in two or more passes.

Here you have a couple options. If there aren't many half laps to cut, I'll simply set the fence (stop) for each shoulder of each lap. But if there are a lot of half laps to cut, then I can save time by making a spacer and using a two-step process.

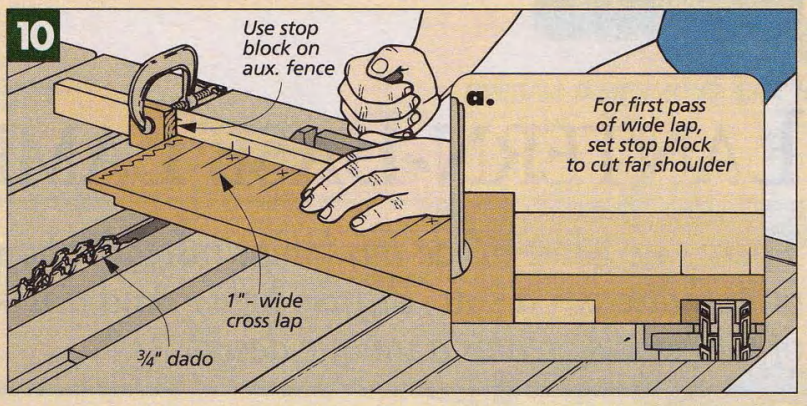
To determine the thickness of the spacer, start with the overall width of the half lap (1" on the serving tray grid). Then subtract the width of the dado blade (¾") from this overall width to find the thickness that your spacer should be (¼").

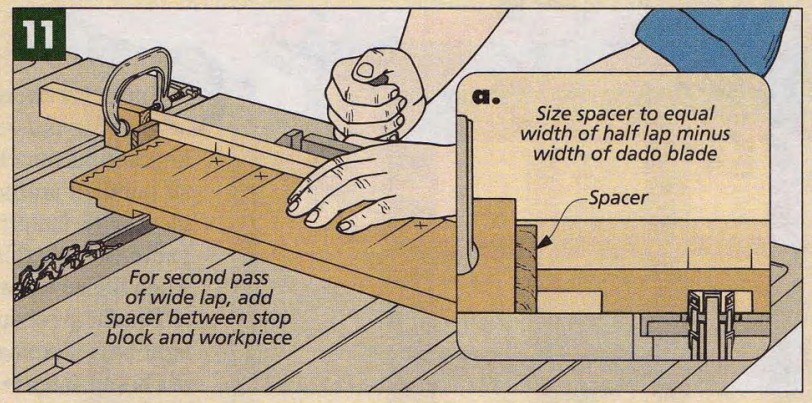
The nice thing is that you don't need to worry that the final half lap ends up *exactly* 1" wide. If it's a hair wider or narrow, that's okay — you'll rip the pieces to fit in the laps after they're cut, refer to Figs. 9 and 9a.

With the spacer in hand, it's time to cut the half laps. As I mentioned earlier, this is a two-step process. The first step is to set up the stop block to cut the shoulder *farthest* from the block, see Figs. 10 and 10a. (I use a long auxiliary fence and a stop block instead of the rip fence. This way, when the spacer is added, it'll "ride" along with the fence, see Fig. 11.)

After making the first pass with the blank butted against the stop block, I slip the spacer between the block and the blank, see Figs. 11 and 11a. This time, the blade will cut the shoulder that's closest to the stop block.

This spacer technique can even be used for laps that require more than two passes. Simply cut both shoulders (using the spacer for the second pass) and then remove the spacer and clean out the waste between the two shoulders in multiple passes. W





HALF LAPS IN THIN STOCK

Using the table saw is a quick and easy way to cut half laps, but it's not always my first choice. When I'm working with thin stock (less than ½"), I like to use a straight bit in my router table, see photo.

There are two reasons for this. First, it makes a cleaner cut than a dado blade. The bottom of the lap is perfectly smooth when cut with a straight bit.

The second thing I like is that half laps end up more consistent when I rout them. The problem with a table saw is that the rotation of the blade tends to push the piece up off the table. So you have to maintain consistent downward pressure all the way through the cut. And thin pieces will flex more than thicker pieces, which compounds the problem. A router solves this because the bit rotates in a different direction.

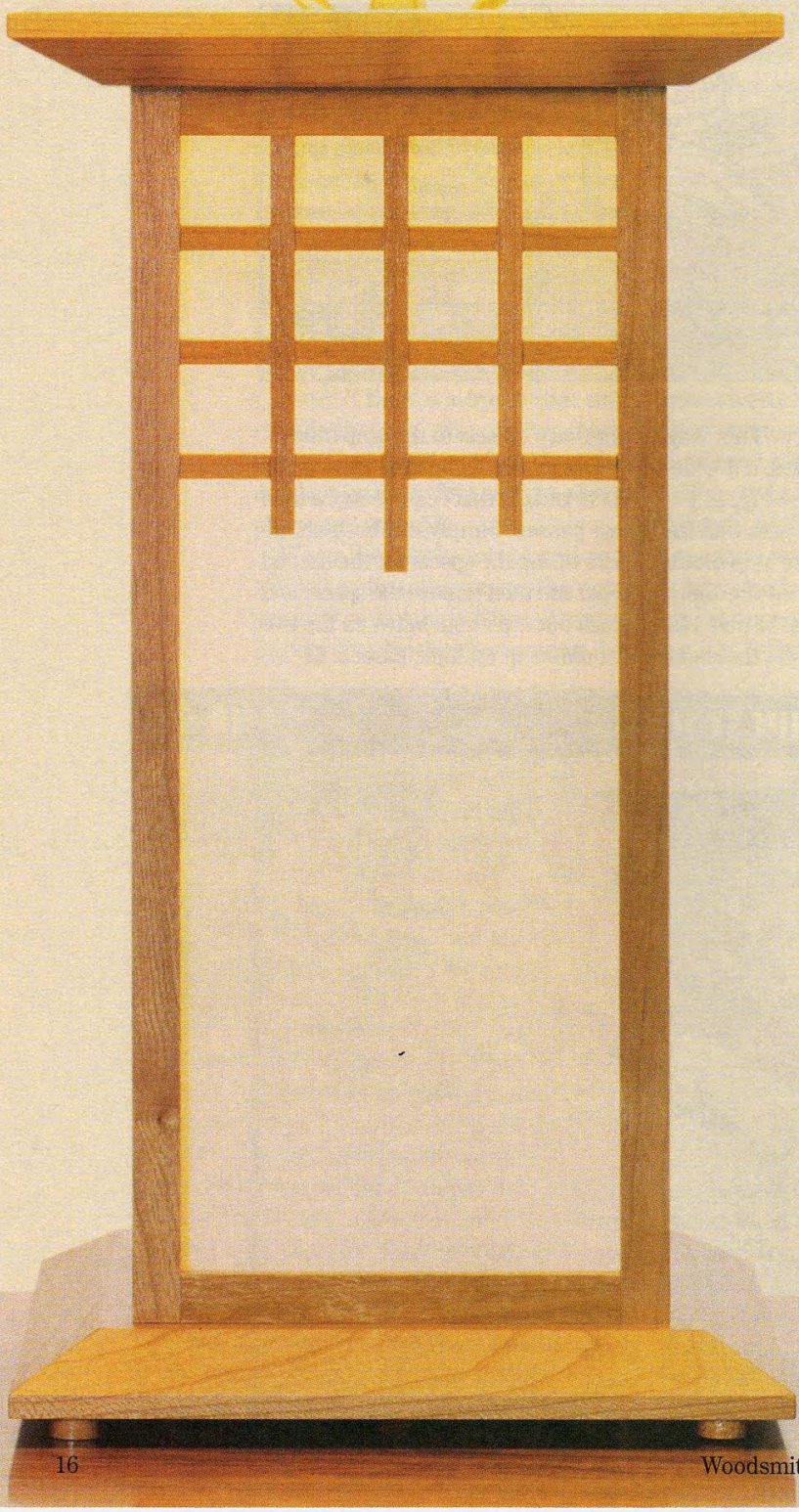
However, watch out for one thing when routing half laps. Because most of the chips end up on the table, you need to make sure they don't end up under the workpiece and affect the depth of the cut.

Assembling thin lap joints can also require a different approach. If there's a frame to glue up, as in the lamp on page 16, then centering the clamps on the stock can be a bit of a balancing act. But my solution was to come up with a clamping jig, see page 30.

FEATURE PROJECT

LANTERN-BASE LAMP

There's no genie inside this lamp; instead it houses a small bulb that casts a soft, diffuse light. And a wood grid in front of the panels creates a unique design.



One of my favorite childhood memories is of my father digging out an old oil lantern whenever a storm knocked out our electrical power. The whole family would sit huddled around the kitchen table within the warm glow of the lantern, talking and telling stories. Although I never said anything, I was always a little bit disappointed when the power was eventually restored.

This lamp reminds me a lot of that old lantern. A small light bulb illuminates the base of the lamp. But instead of a bright, intense light, paper-covered panels in the sides of the lamp diffuse the light, casting a soft glow.

RICE PAPER. To create this effect, the panels are made out of rice paper (available at most art stores, or see sources on page 35). But because rice paper is fragile, I was concerned that it might get damaged unless it was supported by a backing. So to strengthen the paper we mounted it to some clear Plexiglas.

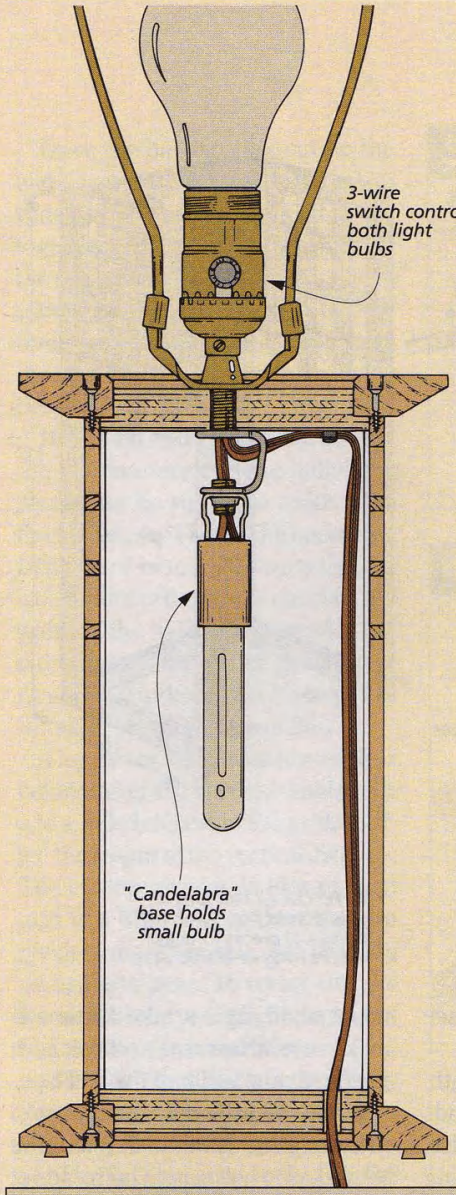
But that's not the only interesting thing about this lamp. At the top of each frame is a wood "grid" made up of small pieces joined together with half laps. So when the panel is backlit by the light bulb, it creates a windowpane effect. It's a simple design that creates a unique lamp.

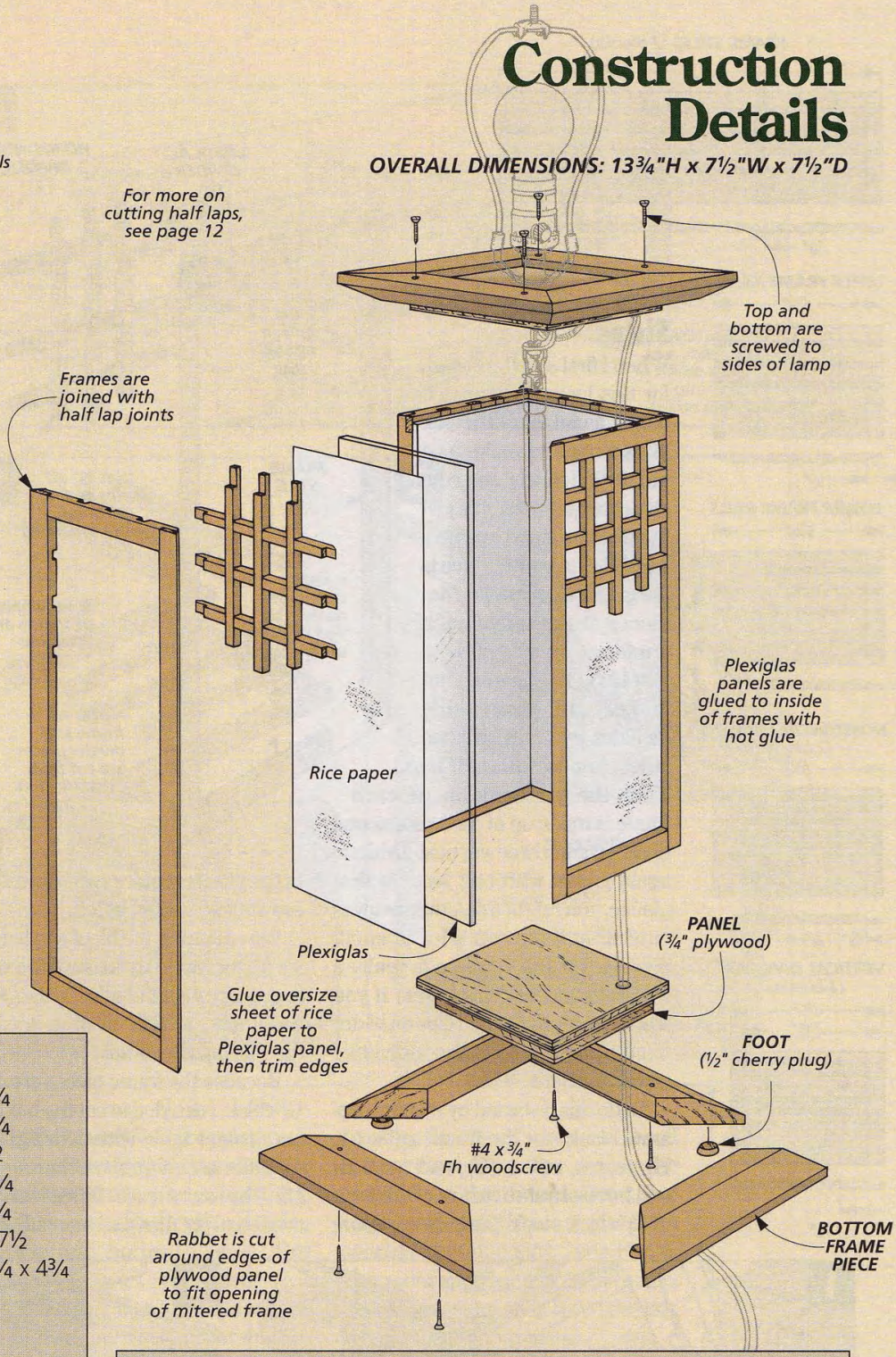
HALF LAPS. The trickiest part about making the lamp is figuring out a safe way to cut the half laps on all those tiny pieces. The solution we came up with is to make the half laps in "gang" cuts. This just means that we cut the joints on several pieces at one time. (For more on cutting half lap joints, see the technique article on page 12.)

▲ *This lamp features two bulbs — one in the base and one above. A switch with three settings allows you to turn on the base only, the top only, or both at once.*

Construction Details

OVERALL DIMENSIONS: 13¾"H x 7½"W x 7½"D





MATERIALS

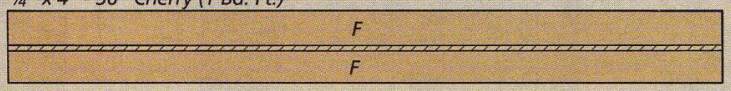
A	Upper Frame Rail (4)	¼ x ½ - 5¼
B	Lower Frame Rail (4)	¼ x ½ - 5¼
C	Frame Stiles (8)	¼ x ½ - 12
D	Vertical Dividers (12)	¼ x ¼ - 4¾
E	Horizontal Dividers (12)	¼ x ¼ - 5¼
F	Top/Btm. Frame (8)	¾ x 1⅝ - 7½
G	Top/Btm. Panels (2)	¾ ply. - 4¾ x 4¾

SUPPLIES

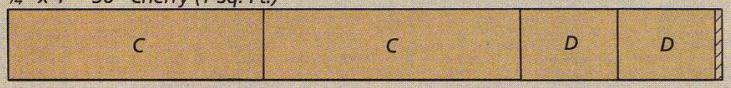
- (4) ½"-dia. Flat Cherry Plugs
- (8) #4 x ¾" Fh Woodscrews
- (4) Rice Paper Sheets 5" x 12" (Rough)
- (4) ⅛" Plexiglas Panels 4⅝" x 11⅜"
- (1) Hickey
- (1) 1¾"-long Nipple (⅜" O.D.)
- (1) ½"-long Nipple (⅜" O.D.)
- (1) Collar
- (1) 2 Circuit 3 Wire Brass-Plated Switch
- (1) 2" Candelabra Base
- (1) Plastic Hold-down w/Nail
- (1) 8 ft. 18/2 Cord w/Plug
- (1) Brass-plated Harp w/Finial
- (1) Lamp Shade

CUTTING DIAGRAM

¾" x 4" - 36" Cherry (1 Bd. Ft.)

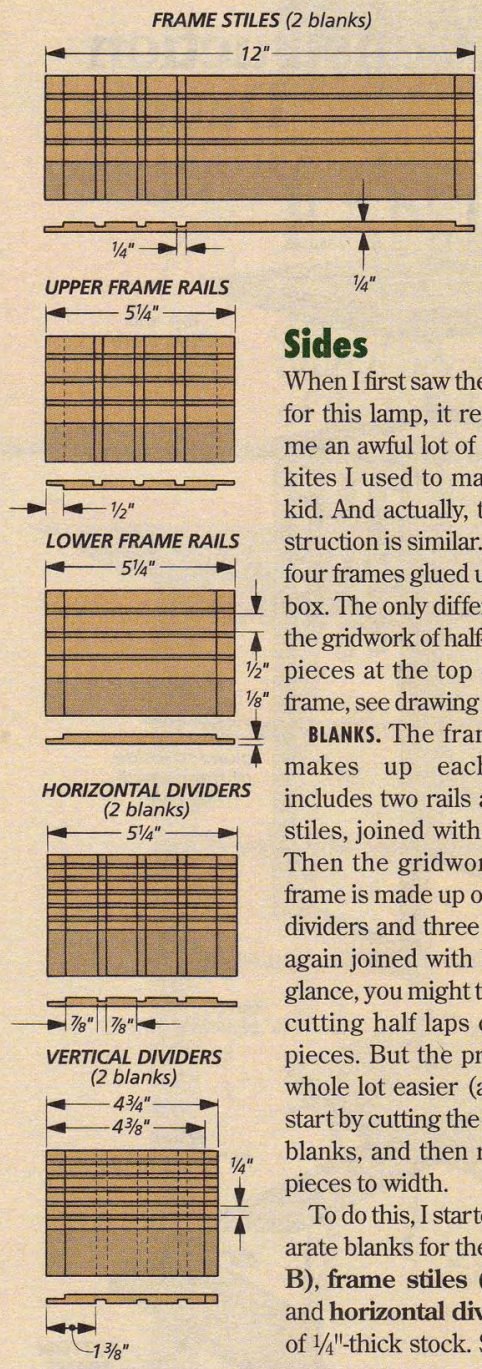


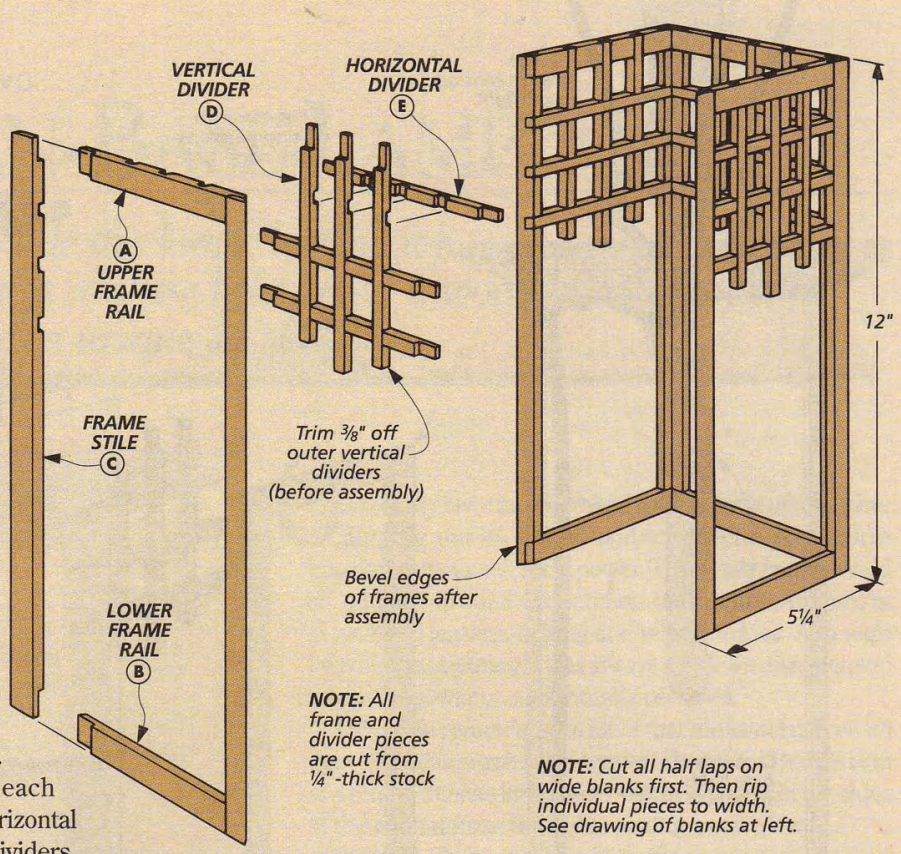
¼" x 4" - 36" Cherry (1 Sq. Ft.)



¼" x 4" - 36" Cherry (1 Sq. Ft.)

NOTE: *Also need two 5" x 5" pieces of ¾"-thick cherry plywood*





Sides

When I first saw the design for this lamp, it reminded me an awful lot of the box kites I used to make as a kid. And actually, the construction is similar. It's just four frames glued up into a box. The only difference is the gridwork of half-lap trim pieces at the top of each frame, see drawing at right.

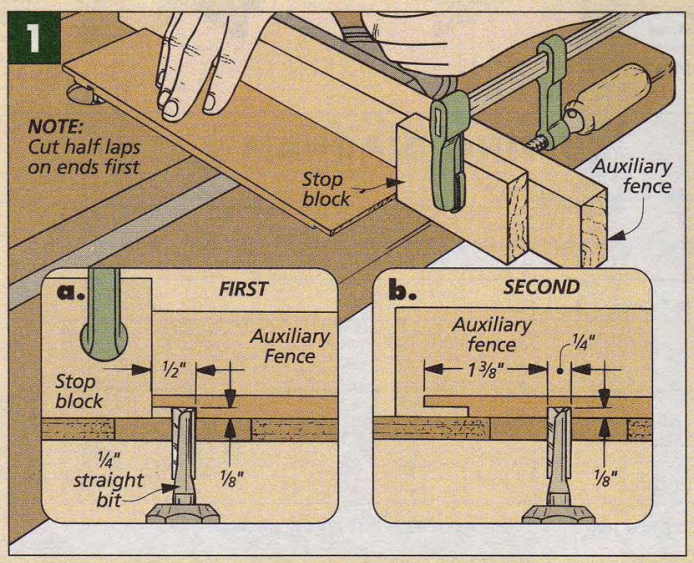
BLANKS. The frame that makes up each side includes two rails and two stiles, joined with half laps. Then the gridwork inside each frame is made up of three horizontal dividers and three vertical dividers, again joined with half laps. At first glance, you might think this involves cutting half laps on a lot of small pieces. But the process is really a whole lot easier (and faster) if you start by cutting the half laps on wider blanks, and then rip the individual pieces to width.

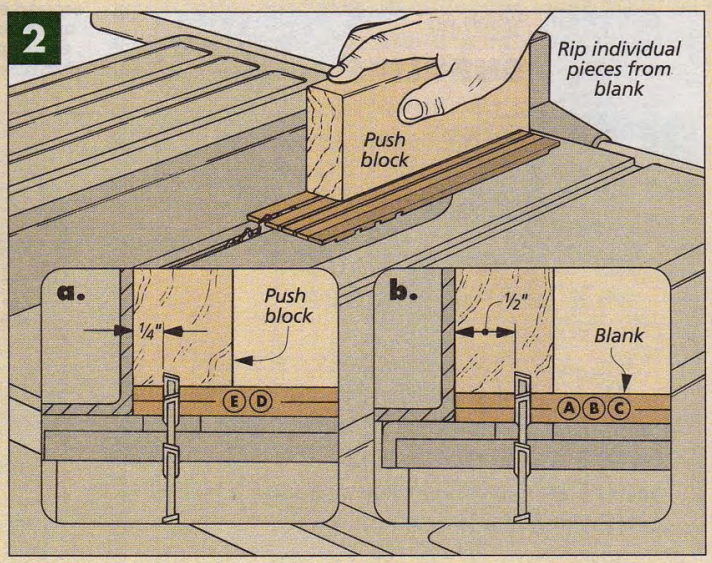
To do this, I started by making separate blanks for the **frame rails (A, B)**, **frame stiles (C)**, and **vertical** and **horizontal dividers (D, E)** out of 1/4"-thick stock. Shop Note: Some of the pieces require two blanks, see drawing in margin at left.

When cutting the blanks to length, it's important to make sure the ends are square with the sides. Otherwise, you'll have a difficult time keeping the half laps lined up.

Because the frame pieces are only 1/4"-thick, I decided to cut the half laps on a router table with a straight bit (see the technique article on page 12). The router leaves a cleaner, more consistent cut than a table saw. But the important thing is to take the time to make several test cuts to check both the depth and width of the half laps.

CUTTING THE HALF LAPS. The first step in cutting the joints is to make the 1/2"-wide end half laps on both ends of the blanks, see Figs. 1 and 1a. (Note: The blanks for the vertical dividers receive a half lap on only one end.) This is done by making two passes, clamping a stop block to the miter gauge fence to establish the shoulder of the end half laps, see Fig. 1a.





Once the half laps are cut on the ends, you can start cutting the 1/4"-wide half laps that join the grid pieces together, see Fig. 1b. These are cut in the same manner, using a stop block clamped to the miter gauge. The only thing is that you'll have to reposition the stop block to create the spacing between the half laps.

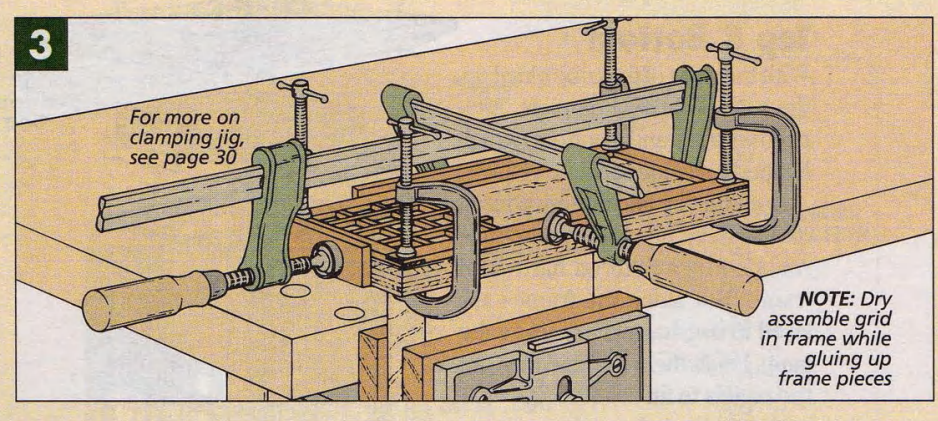
RIPPING THE PIECES TO WIDTH. After all the half laps are cut, the individual pieces can be ripped to width from the blanks, see Fig. 2. The important thing here is to make sure the finished width of the pieces matches the width of the half laps, otherwise the pieces won't fit together. (I made my dividers 1/4" wide and the frame pieces 1/2" wide, see Figs. 2a and 2b.)

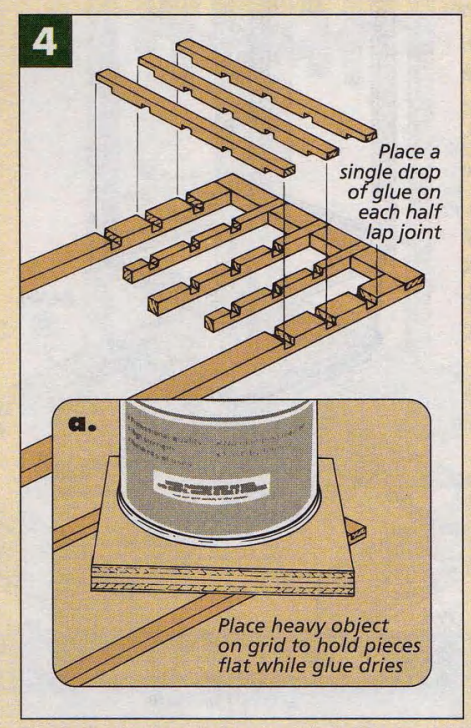
There's one more step to complete before the grid can be assembled. To add a little interest to the grid, I varied the length of the vertical dividers. The center vertical divider of each grid is a little longer than the two dividers on either side, see drawing on opposite page. To create this difference, I trimmed 3/8" off the end of eight of the vertical dividers.

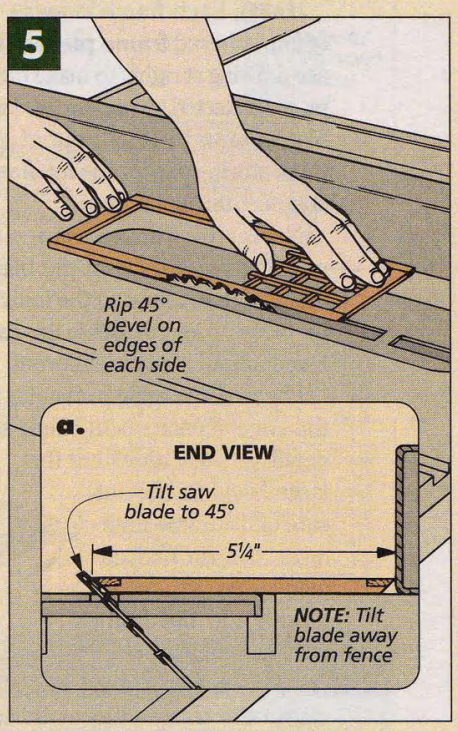
ASSEMBLY. When it came to gluing the sides up, I used a simple jig to help keep the frames square and flat, see Fig. 3. (For more on this jig, see page 30.) And rather than trying to glue up all the pieces at once, I glued the frame pieces first and then glued the grid pieces into the frames, see Fig. 4. Shop Note: To avoid having to clean up a lot of glue squeeze out, I used a single drop of glue on each half lap when gluing in the dividers.

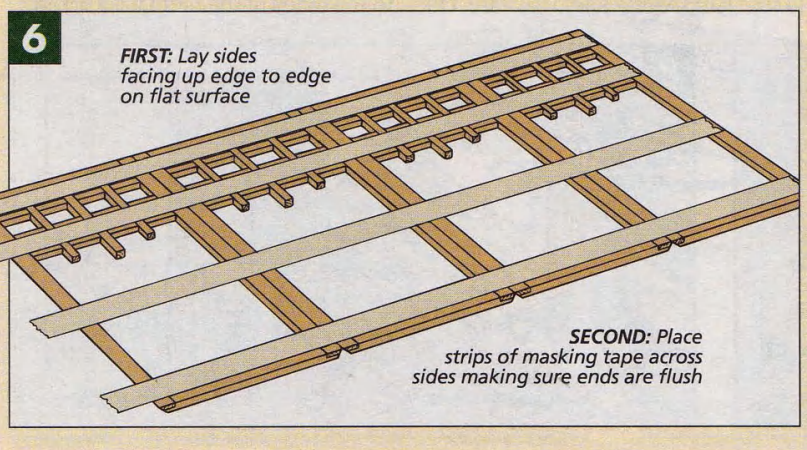
Before the sides can be glued up into a "box," the edges need to be beveled. To do this, I used a table saw, tilting the blade 45° and ripping each side along the edges, see Figs. 5 and 5a.

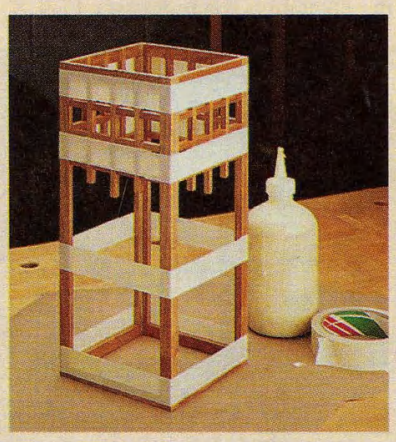
GLUING UP THE BOX. The sides of the lamp are assembled before making the top and bottom panels. But because the sides are so delicate, I was afraid that using clamps to hold the pieces together might end up crushing the "box." So instead, I used ordinary masking tape, laying the frames down in a row and placing four strips of tape lengthwise across them overhanging one side , see Fig. 6. Then after applying glue to the edges of the frames, I simply taped the box together, see photo below.











Strips of ordinary masking tape hold the delicate sides of the lamp together. Just remember to check and make sure the box is square.

Top & Bottom

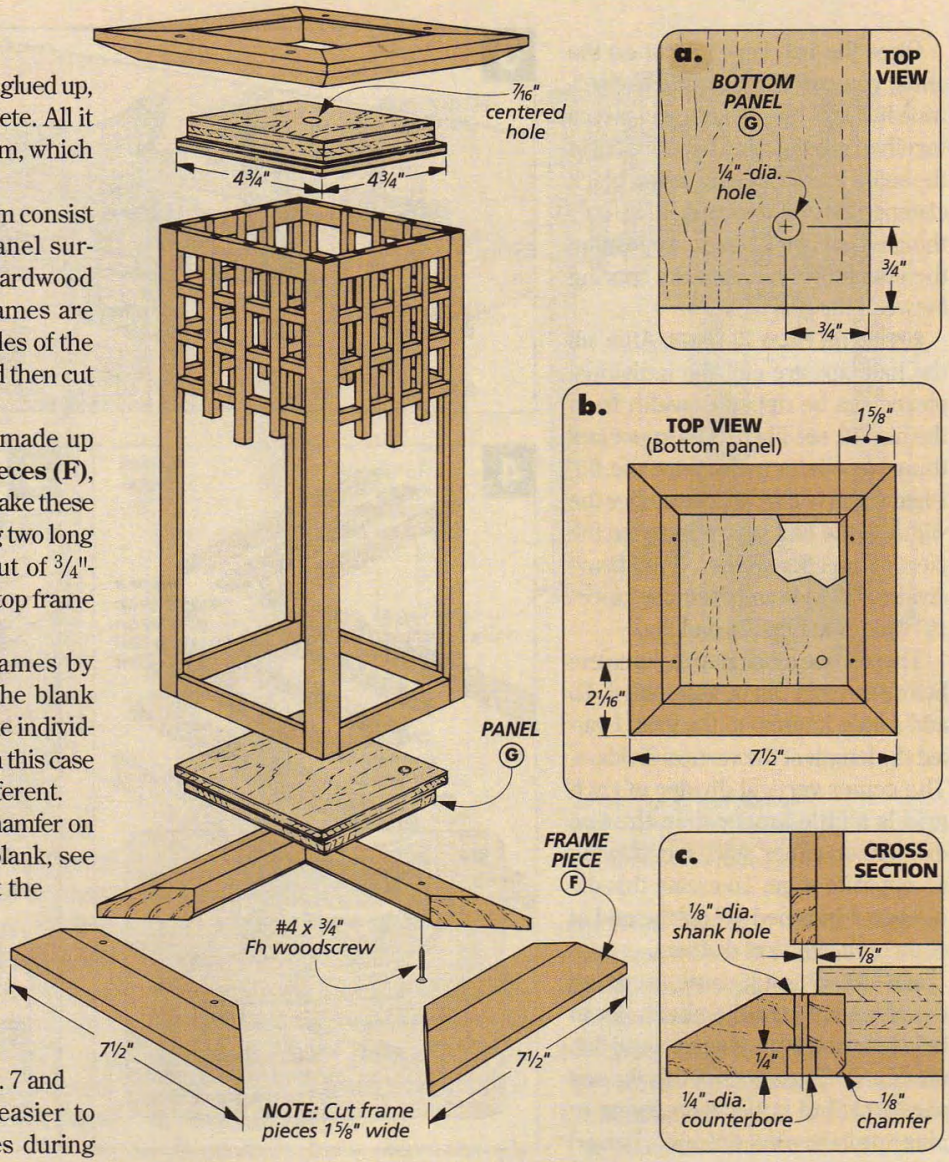
With the sides of the lamp glued up, the base is almost complete. All it needs is a top and a bottom, which happen to be identical.

Both the top and bottom consist of a square plywood panel surrounded by a mitered hardwood frame. But since the frames are sized to overhang the sides of the lamp, I built them first and then cut the panels to fit.

FRAMES. Each frame is made up of four mitered **frame pieces (F)**, see drawing at right. To make these pieces, I started by ripping two long blanks to width ($1\frac{5}{8}$") out of $\frac{3}{4}$"-thick stock, (one for the top frame and one for the bottom).

Normally, I make frames by molding the profile on the blank first and then mitering the individual pieces to length. But in this case I went about it a little different.

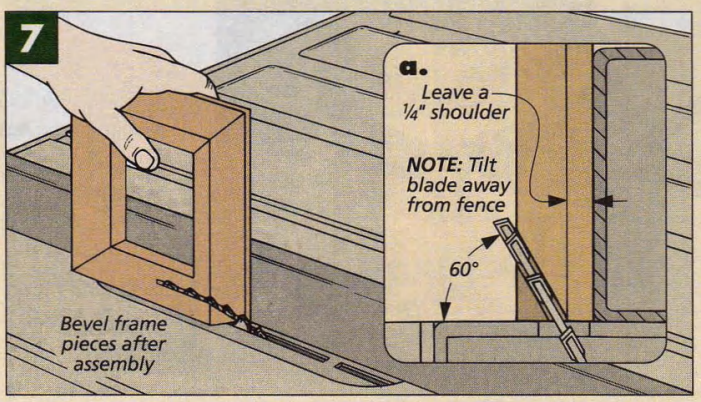
I began by routing a chamfer on the edge of each uncut blank, see detail 'c'. But I didn't cut the large bevel on the outside of the frame until *after* the individual pieces were mitered to length and the frames were assembled, see Figs. 7 and 7a. This made it a lot easier to clamp the frames pieces during assembly and glue up.

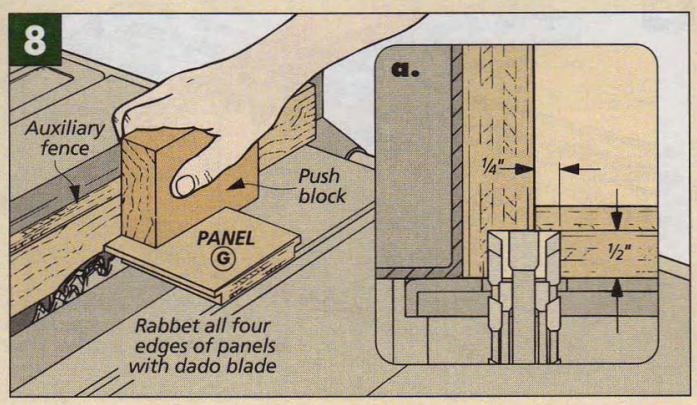


PANELS. Once the frames were completed, I made the plywood panels that fit inside. Each **panel (G)** starts out as a square piece of $\frac{3}{4}$"-thick plywood, cut to fit inside the opening of the body of the lamp. (Mine were $4\frac{3}{4}$" square.) Next a rabbet is routed on all four edges of the panel to fit inside the opening of the frame, see Figs. 8 and 8a. The height (depth) of this rabbet is $\frac{1}{2}$". But the width will depend upon the opening of your frames. (My rabbet was $\frac{1}{4}$" wide.) I found it easiest to cut the rabbets slightly narrow and then sneak up on the final width.

DRILL HOLES. Before gluing the panels into the frames, holes are drilled for the lamp wiring and hardware. On the top panel, I drilled a $\frac{7}{16}$"-dia. hole right in the center of the panel for the lamp hardware. But on the bottom panel, a $\frac{1}{4}$"-dia. hole is drilled in the corner for the electrical cord, see detail 'a' above. Then the panels can be glued into the frames.

The top and bottom are attached to the sides of the lamp with screws.





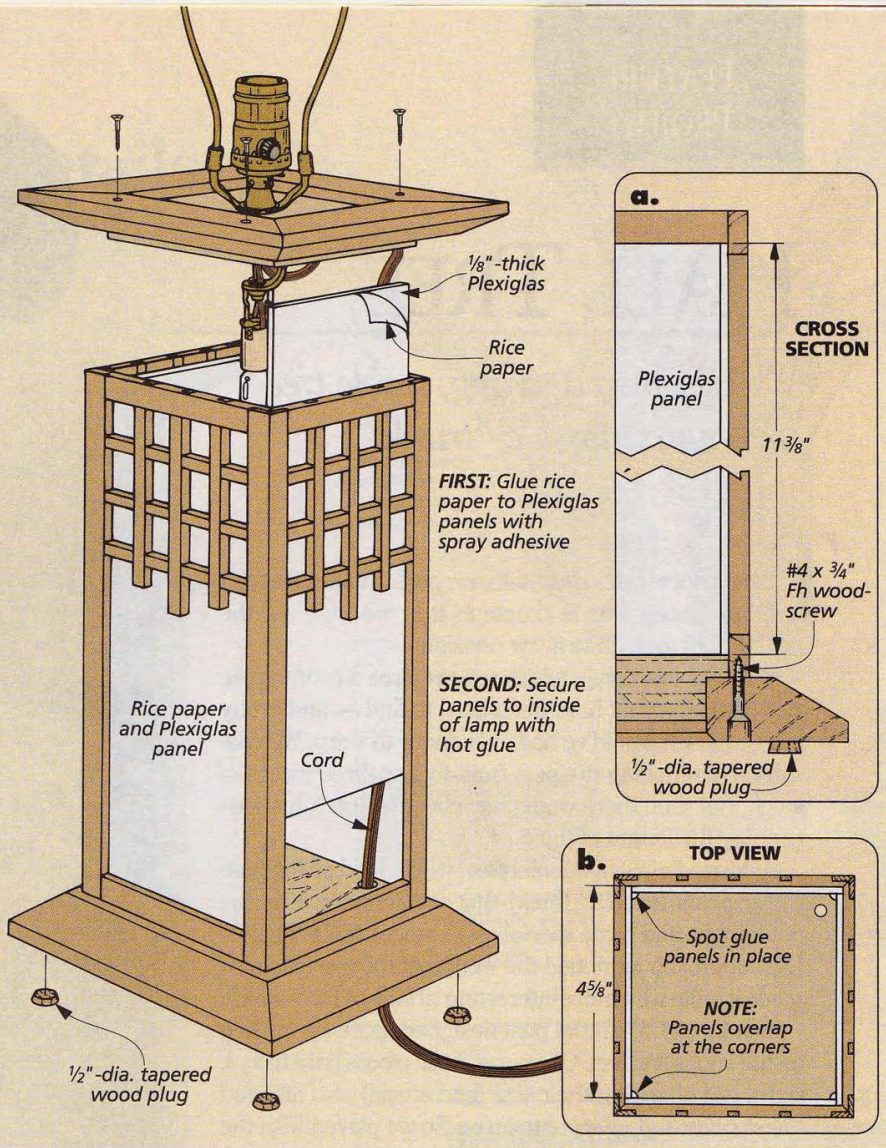
So the next step is to drill counterbored holes for the mounting screws, see details 'b' and 'c' on opposite page.

The top doesn't get screwed in place until after the lamp is wired. But the bottom is attached at this point. Then I glued ½"-dia. tapered, flathead plugs to the bottom to serve as "feet," see detail 'a' at right.

FINISH. It's easier to finish the base of the lamp before the hardware and wiring are added. And because of all the tiny spaces created by the gridwork, I used a spray lacquer (Deft).

PANELS. While the finish was drying, I started working on the rice paper panels. I could have simply glued the rice paper behind each grid, but I was worried that it might get torn or damaged. So to provide some backing, I mounted the rice paper to Plexiglas panels using a spray adhesive. These panels are cut to fit inside the lamp. Once the rice paper is attached, the panels are placed inside the lamp and glued in place with a hot glue gun.

WIRING. Finally, I threaded the cord through the hole in the bottom and wired the lamp, see box below. Then I secured the top with screws and added a lamp shade. W

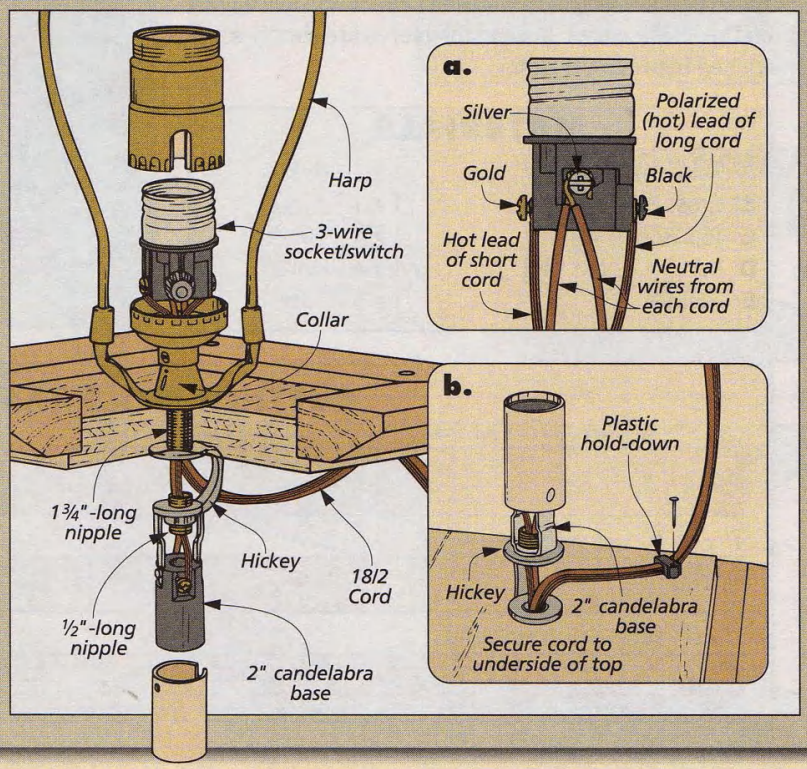


WIRING THE LAMP

Wiring the lamp isn't really difficult, but if you're at all unsure about how to proceed, it's probably best to hire an electrician or take the lamp to a lamp store to have it wired.

Although the lamp has two sockets, the one that contains the switch is a 3-wire socket, which can operate each bulb separately or both at the same time. This type of socket has two "hot" leads and one neutral lead. This allows the second socket to be "pig-tailed" to the first.

A short length of 18-2 wire is used to connect the neutral leads and the hot leads of the two sockets (make sure to keep these separate — hot to hot and neutral to neutral). Then the two wires from the power cord are attached to the upper socket, one to the neutral lead and one to the remaining hot lead.



FEATURE PROJECT

HALL TREE

We designed a strong, stable tree without a massive "trunk."

There's not much to this hall tree: posts, hooks, feet and cross pieces. But as simple as it is, working out the final design took quite a few revisions.

POST. For one thing, a hall tree requires a center post. A solid post would have been hard to find — and pretty heavy. Plus, it would've had a tendency to warp. We considered laminating the post from two or three pieces of stock. But then there would have been visible joint lines running the length of the post.

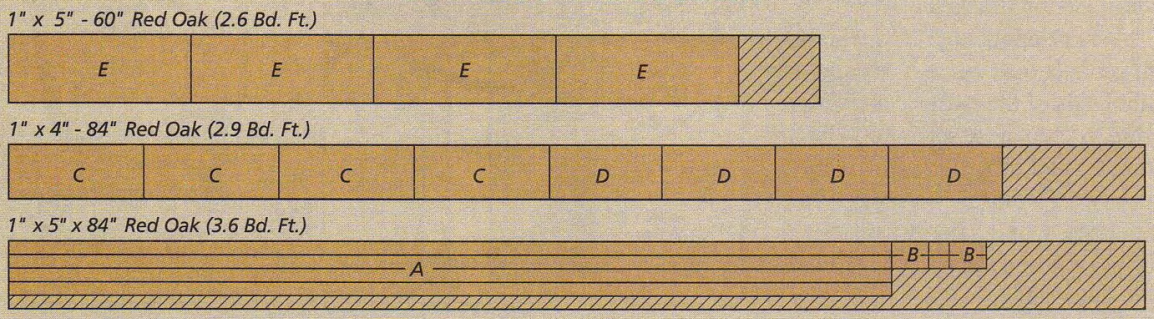
So instead of a single, solid post, we decided on four narrower posts (each 1" thick) that are connected by the hooks, feet, and some special cross braces. This "Lincoln Log" approach lightened the weight of the tree and also made it quite a bit more interesting to look at (and build).

HOOKS & FEET. With the post designed, next we worked on the hooks and feet. Of course, these pieces have to look right. But changing their size (and shape) also affected the stability and utility of the tree. So we played with the shape of the pieces and their lengths, trying to get a balanced look that worked well when you added coats, hats, and umbrellas. This required building several prototypes. But that wasn't a big deal; you don't have to cut any tenons on the inside edges. Instead the pieces are simply sandwiched between the posts.

MATERIALS

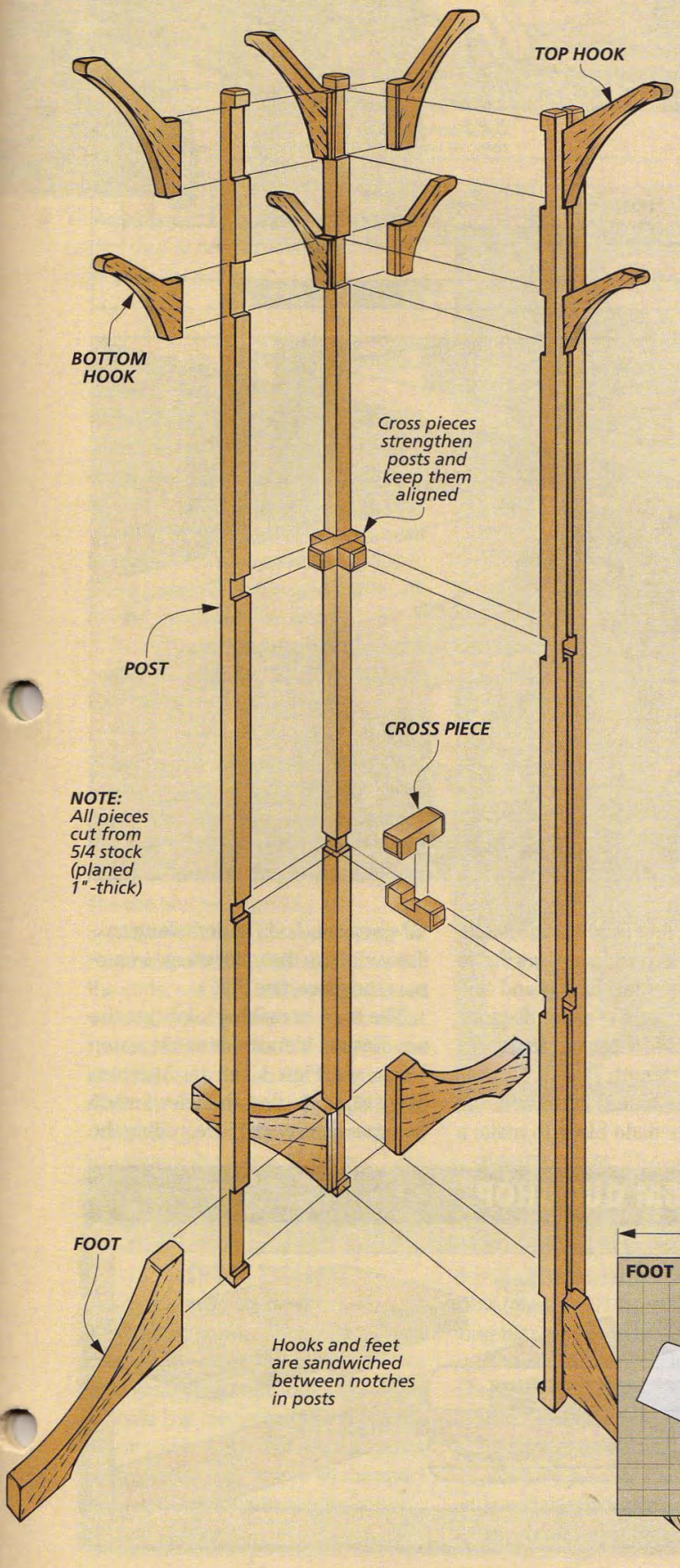
A	Posts (4)	1 x 1 - 65¼
B	Cross Pieces (4)	1 x 1 - 3
C	Top Hooks (4)	1 x 4 - 10
D	Bottom Hooks (4)	1 x 4 - 8
E	Feet (4)	1 x 5 - 13½

CUTTING DIAGRAM

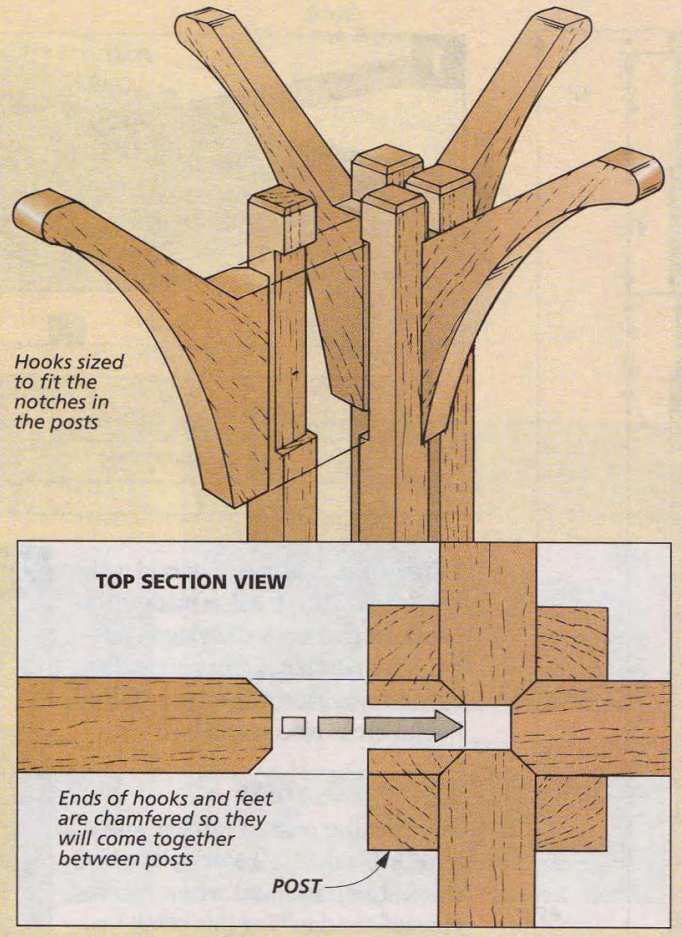


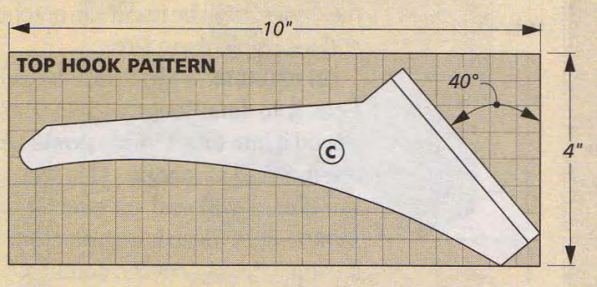
Construction Details

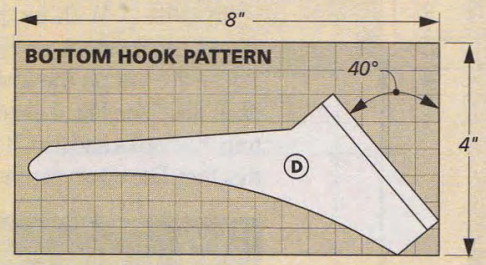
OVERALL DIMENSIONS: 69¾"H x 22⅜"W x 22⅜"D



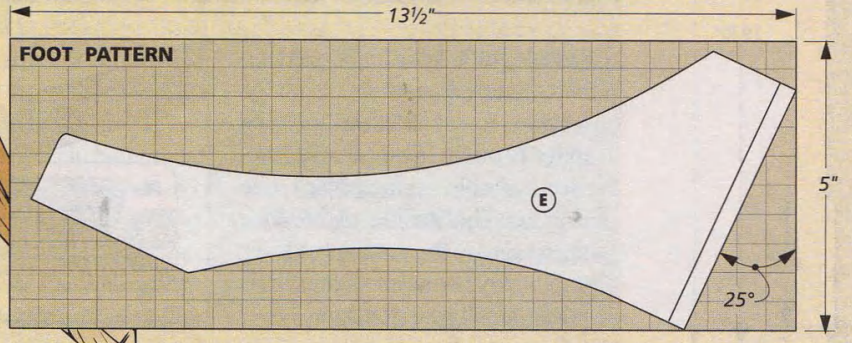
NOTE: *All pieces cut from 5/4 stock (planed 1"-thick)*



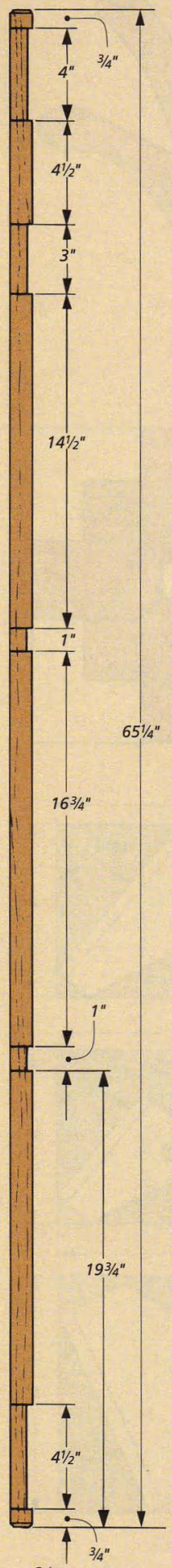


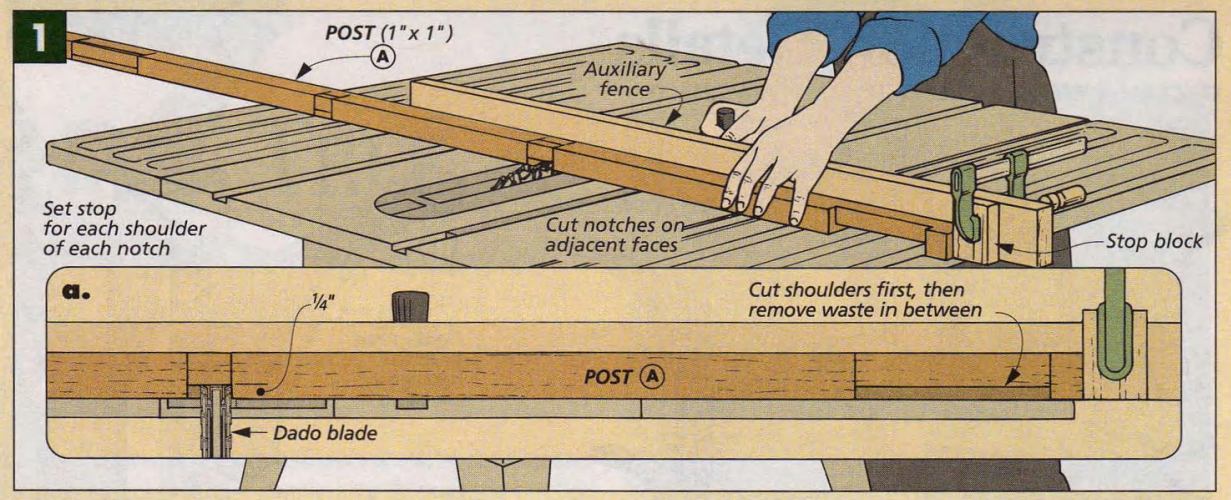


NOTE: *All grids are ½" square, to order full-size patterns, see page 35*



POST DETAIL





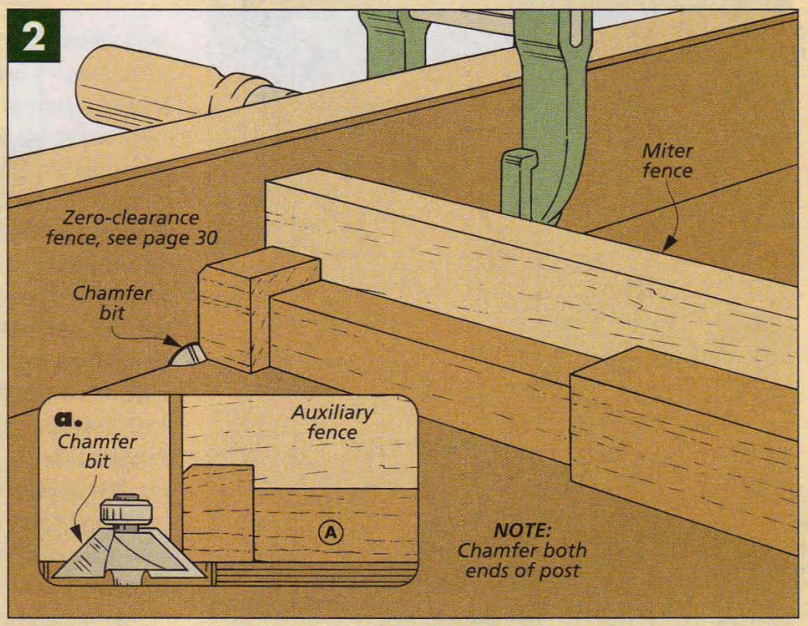
To build this hall tree, I started with the "trunk." This trunk is made up of four long posts, see drawing in margin. Each post has a series of notches cut on two adjacent faces to hold the hooks, cross pieces, and feet.

POSTS

To make the posts, I started with a 5"-wide blank of 5/4 stock planed 1" thick. Keep in mind when you're choosing and milling this blank that the straighter these pieces are now, the easier it will be to cut the notches and assemble them later.

CUT TO LENGTH. With the blank ready, I cut it to final length (65¼") and ripped it into four 1"-wide **posts (A)**, see drawing in margin. This way, all the pieces will end up exactly the same length, which is important when it comes time to cut the notches.

CUT NOTCHES. With the posts cut to size, I began work on the notches. These are cut on the inside faces of each post, see Fig. 1. And since they trap the hooks and feet, it's important that they line up across the four posts.



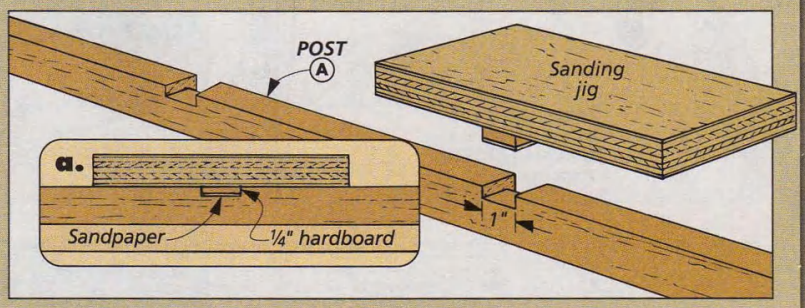
To do this, first I laid out the notches on a single post, see drawing in margin. (Note that the top and bottom notches are the same distance from the ends of the post, but they're not the same length.)

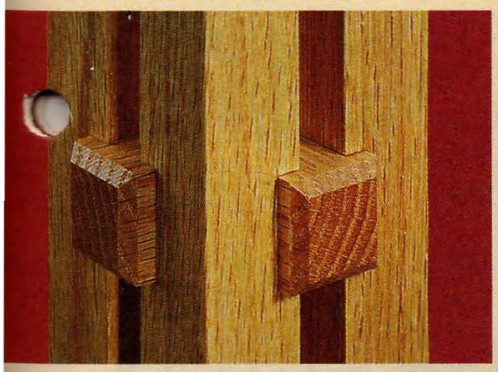
With the notches laid out on one post, I set the dado blade to make a ¼"-deep cut. And I added a long auxiliary fence to the miter gauge to support the piece, see Fig. 1.

The trick to making sure that the notches are identical is to use a stop block, see Figs. 1 and 1a. After setting it to cut the first shoulder, I made two passes on each piece, rolling the

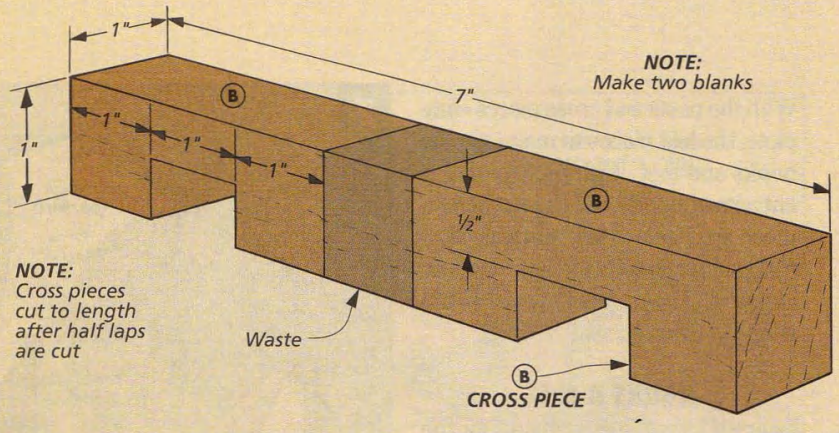
TIP FROM OUR SHOP

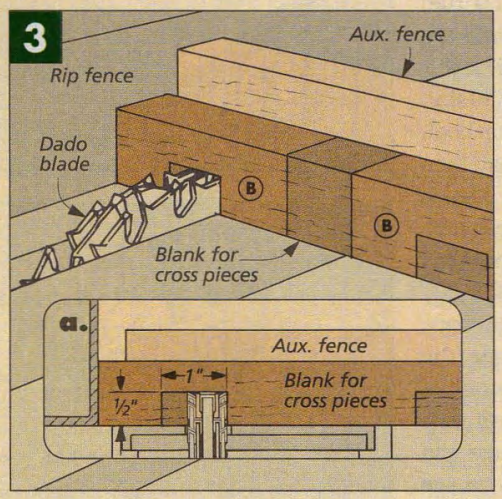
SANDING BLOCK. If the notches on the posts aren't smooth, you'll notice it when the hooks and feet are glued between them later. So I created a simple sanding block, see drawing. The "handle" of the block spans across the notches so their depth stays consistent and their edges aren't rounded over.

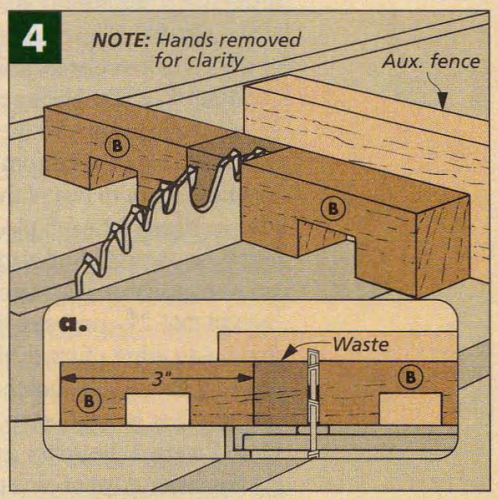


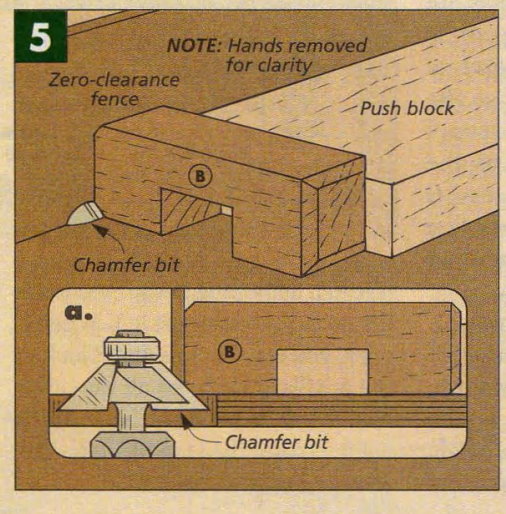


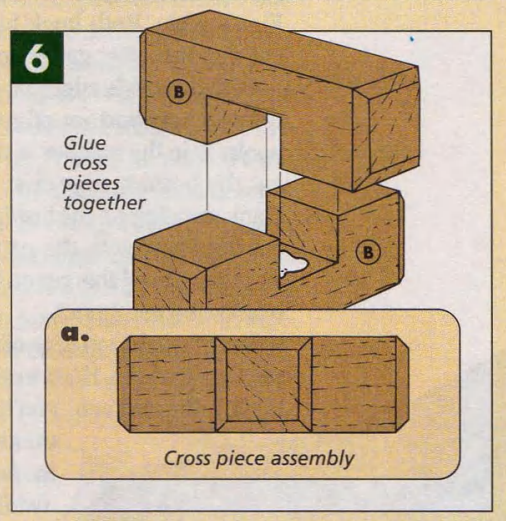
▲ *To keep the posts from bowing at the center, they're held together with simple cross piece assemblies.*











post between passes so the notches ended up on adjacent faces.

When the first shoulder had been cut on all the posts, I moved the stop block to cut the second shoulder of the notch. After making this cut, any waste between the two shoulders can be removed with overlapping passes. Then I worked on the next notch, following the same procedure.

Note: Because of the length of the posts, you'll need to flip them around halfway through this process.

When the notches were cut, I noticed they had some shallow kerf marks left by my dado blade. I was concerned that these marks would be visible after assembly. So to remove them, I made a simple sanding jig, see the box on page 24.

CHAMFER ENDS. With the saw marks removed, all that's left is to chamfer the ends, see Fig. 2. These pieces are so long that I was concerned about routing this chamfer, but I found that holding them flat on the table wasn't difficult, especially when using the miter gauge and an auxiliary fence to support the piece. However, I did decide to add a zero-clearance fence. (For more on this, see page 30.)

CROSS PIECES

When the posts are complete, I began working on some cross pieces. Each cross piece assembly consists of two individual pieces and looks like short Lincoln Log pieces stacked together. Their purpose is to connect the posts in the middle of the tree so the spacing stays even from top to bottom, see photo above.

OVERSIZE BLANKS. The **cross pieces (B)** fit in the notches in the center of the post. (Mine were 1" x 1".) Their final length will be 3". However, since this is a bit short to work with on the table saw safely, I started with two 7"-long blanks, see drawing above.

With the two blanks in hand, I cut a half lap near both ends of each so the cross pieces would overlap, see Fig. 3. To support these blanks, I attached an auxiliary fence to the miter gauge and used the rip fence as a stop. (For more on cutting half laps, see the article beginning on page 12.)

CUT TO SIZE. Now the blanks can be cut into four cross pieces, see Fig. 4. (This time, you can't use the rip fence as a stop because the piece will kick back, see the box on page 14.) Then all that's left is to chamfer the ends, see Fig. 5. Here again, I used the zero-clearance insert. But this time, I supported the pieces with a push block.

Now the cross pieces can be glued together and set aside until after the hooks and feet are made and the tree is ready to be assembled, see Fig. 6.

With the posts and cross pieces complete, the last pieces to make are the hooks and feet. With the two different sets of hooks and the set of feet, there are twelve different pieces to make. Fortunately, the procedure is identical. The only difference is the shape of the pieces.

HOOKS & FEET

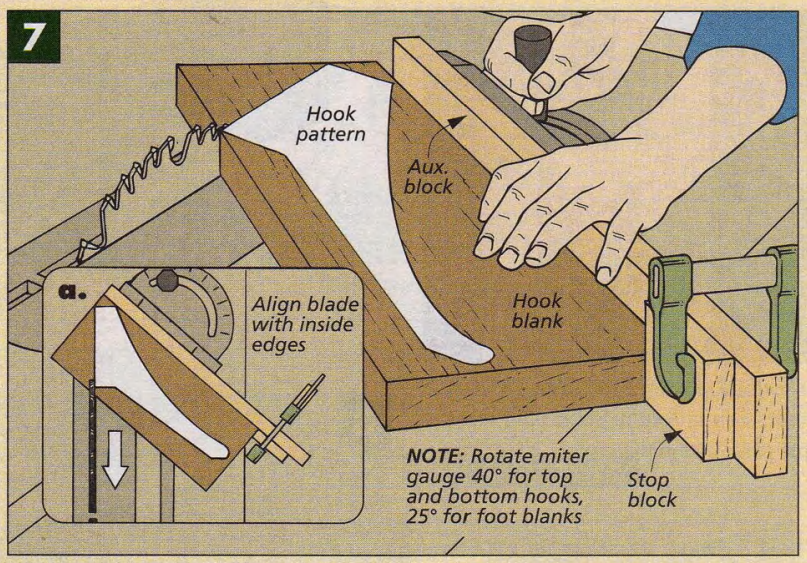
I started by cutting the blanks for the **top (C)** and **bottom hooks (D)** from 1"-thick stock. (Top hook blanks are 4" x 10"; bottom blanks are 4" x 8".)

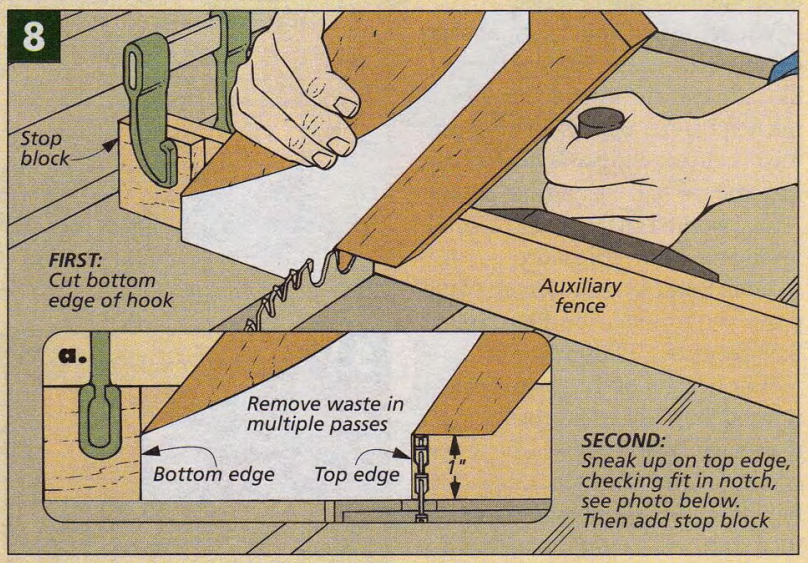
PATTERN. With the blanks cut to size, I created one pattern for the top hook and another for the bottom and then mounted them to two of the blanks. (The patterns for each piece can be found on page 23. Full-size patterns are also available, see page 35.)

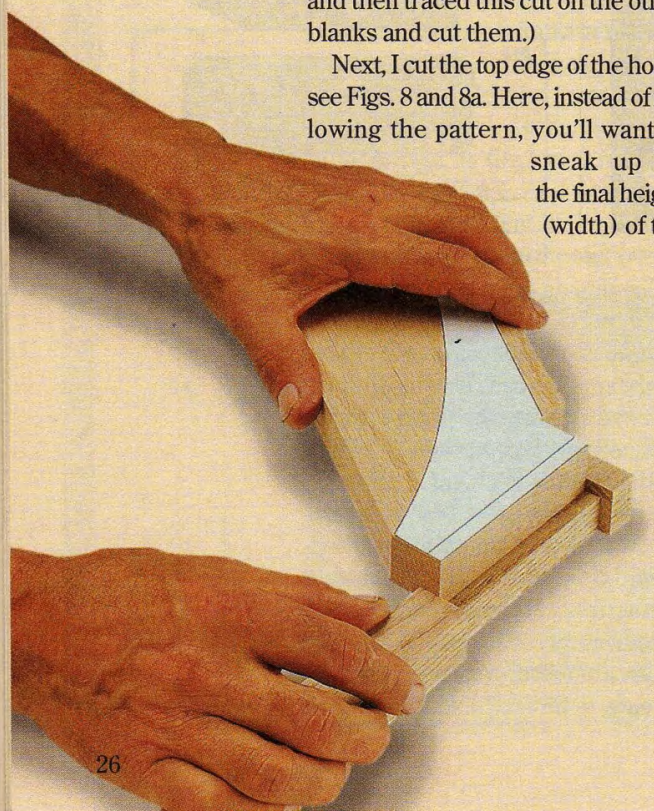
INSIDE EDGE. The next step is to shape the inside edge of each blank (the one that fits into the notches on the posts). This is a two-step process. First, I angled the miter gauge and cut the inside edge of each piece, see Fig. 7. Note: Both hook blanks are cut with the miter gauge angled 40°.

With the inside edge cut, next I cut the top and bottom edges so the hooks fit in the notches in the post. I cut the bottom edge first with the blank standing on the inside edge. (I cut the blank with the pattern first and then traced this cut on the other blanks and cut them.)

Next, I cut the top edge of the hook, see Figs. 8 and 8a. Here, instead of following the pattern, you'll want to sneak up on the final height (width) of the piece so it fits snug in the notches in the posts, see photo at left. When it does, you can clamp a stop block to the auxiliary fence so all the other blanks will be identical. Note: You'll need to reset the stop block for the other set of hook blanks.

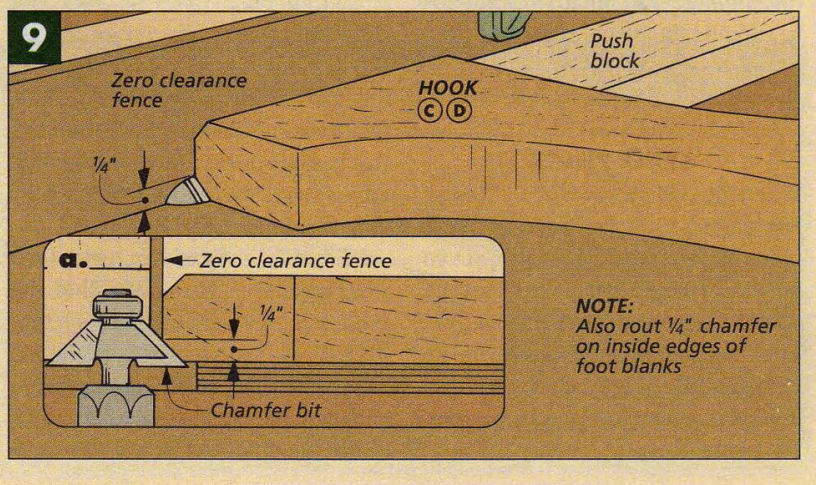


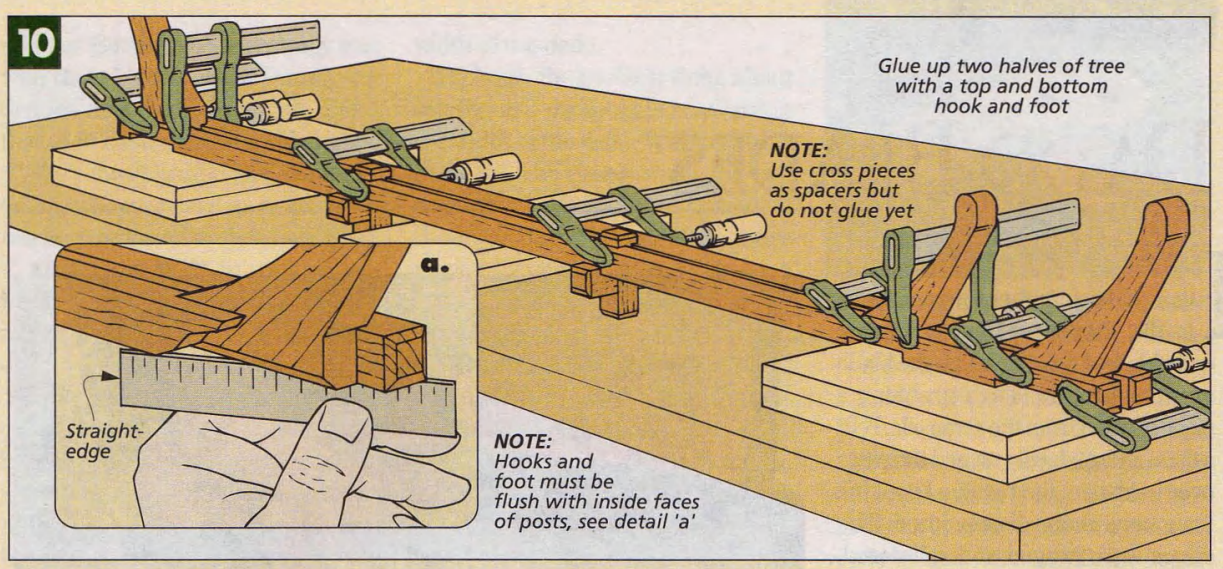




CUT TO SHAPE. Now the rest of the pattern can be cut out. I used the band saw for this and sanded up to the line. When this piece was complete, I traced it on the other blanks so they could be cut and sanded to match.

FEET. With the hooks cut out, you





can work on the **feet (E)**. The procedure here is the same. The only differences are that the blank is larger (5" x 13½", see pattern on page 23) and to cut the inside edge, the miter gauge is rotated 25°, refer to Fig. 7.

CHAMFER INSIDE EDGE. When the feet are cut out and sanded, there's still one more step for both the hooks and feet. I routed a chamfer on the inside edges of each piece, see Figs. 9 and 9a. This ¼" chamfer allows all four pieces to come together in the center, see the Section View detail on page 23.

ASSEMBLY

Now that the hooks and feet are complete, the hall tree can be assembled. Here it begins to look like a large "Lincoln Log" project. But fortunately, there's not much to the assembly, if you take it in steps.

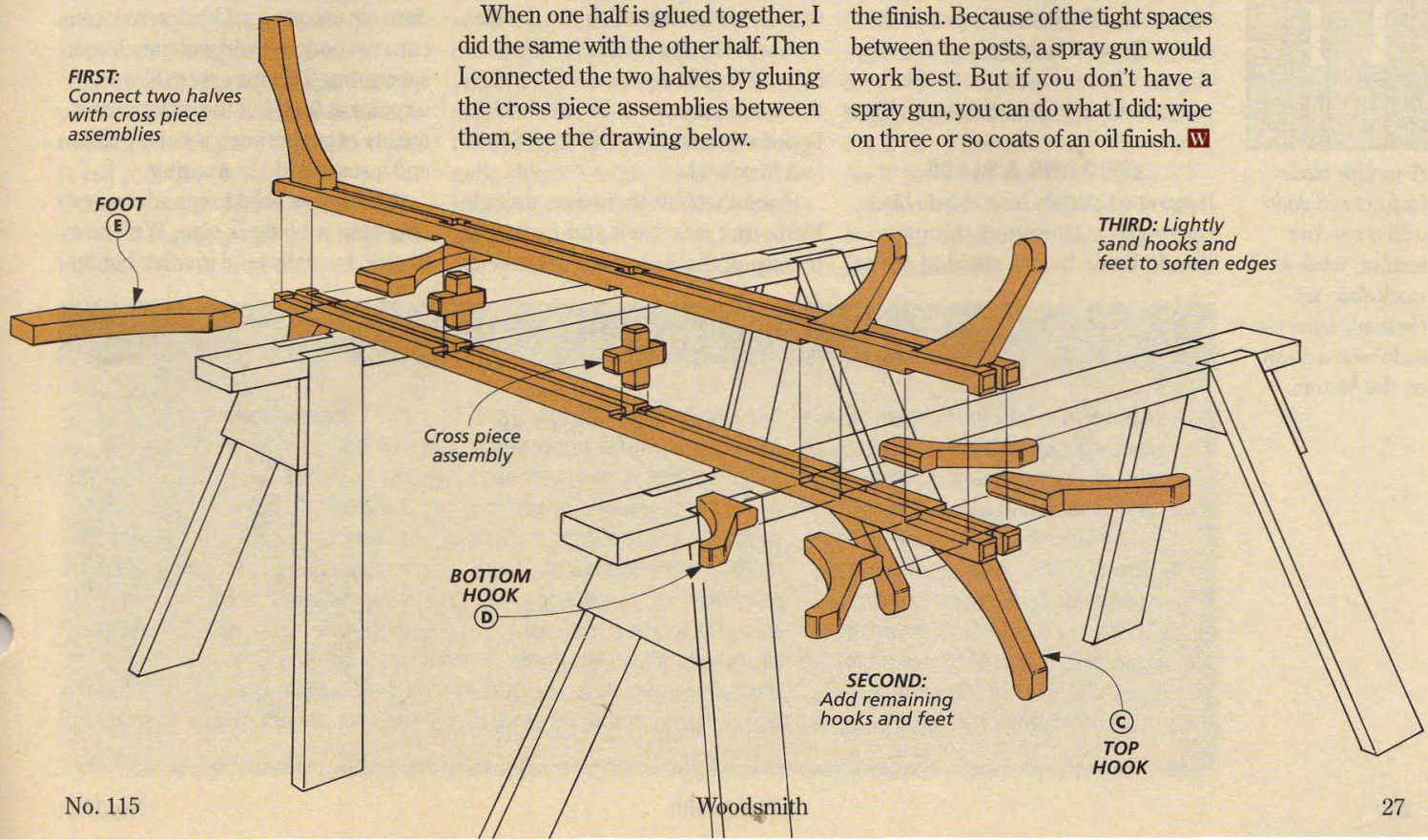
GLUE UP HALVES. The first thing I did was glue up one set of hooks (top and bottom) and a foot between two posts, see Fig. 10. I used the cross piece assemblies to help keep the posts aligned. But the important thing is that the inside edges of all the posts, hooks, and feet are flush, see Fig. 10a.

When one half is glued together, I did the same with the other half. Then I connected the two halves by gluing the cross piece assemblies between them, see the drawing below.

At this point, the remaining pairs of hooks and feet can be glued into the notches, see drawing below. I added one piece at a time, inserting it into the notch and clamping it tight. Shop Tip: To prevent glue squeeze-out, apply glue only to the notches on the post.

After all the hooks and feet were in place, I checked to see if there was a shoulder at the bottom of the hooks. If there was, I sanded the hooks so they made a smooth transition into the posts. Then I softened all the "hard" edges on the hooks and feet.

FINISH. The last thing to do is apply the finish. Because of the tight spaces between the posts, a spray gun would work best. But if you don't have a spray gun, you can do what I did; wipe on three or so coats of an oil finish. W

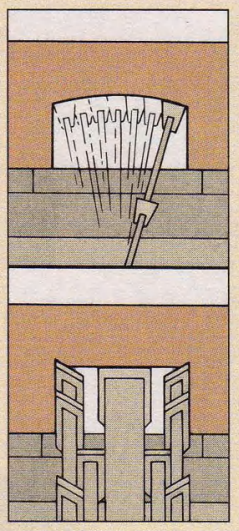


DADO BLADES

I can still remember rushing back to the shop after buying my first dado blade. I quickly set up the blade on my table saw. Then grabbing a piece of wood from the scrap pile, I cut a dado and anxiously turned the piece over to inspect the results. I couldn't have been more disappointed. The edges were ragged and splintered, and the bottom of the dado was anything but flat. That's when I realized there's more to a dado blade than meets the eye.

Basically speaking, all dado blades fall into one of two categories — adjustable or "wobble" dadoes and stack dado sets. Wobble dado blades rely on an adjustable hub which creates runout (wobble) in the blade. This in turn causes the blade to cut a wider kerf. By varying the amount of runout, you can vary the dado width.

On the other hand, a stack dado set uses two blades and a set of "chippers" (these are really just modified blades, usually with only two or four teeth). By sandwiching (stacking) the chippers between the outer blades, you can cut dadoes of varying widths.



▲ *A wobble blade (top) cuts a dado with a concave bottom, while a stack dado set (bottom) leaves a dado with a cleaner, flat bottom.*

CHOOSING A BLADE

If you don't already have a dado blade, there are a couple of things you should know before rushing out to buy one. Like many things in life, you get what you pay for when it comes to dado blades. Although you can pick up a wobble dado blade for between $25 to $70, I'd recommend spending the extra money to buy a carbide-tipped stack dado set ($100 to $300), and here's why.

Since a wobble dado uses a single blade that fans back and forth, the bottom of the dado usually ends up slightly concave, see drawing in margin at left. On the other hand, a stack dado set uses several blades, so it can cut a flat-bottom dado with much less splintering. This may seem like a trivial point at first, but the difference in quality of cut between a wobble dado and a stack dado is amazing.

SIZE. Another point to consider when choosing a blade is size. With saw blades, I usually tend to think bigger

HELPFUL DADO BLADE TIPS

- ***Clean.*** *For best performance, keep your dado blade (including the chippers) clean. Pitch and wood fibers can reduce the cutting efficiency of the blade.*
- ***Sharp.*** *Have your dado blade sharpened by a reputable sharpening service. And make sure to have all chippers of a stack dado set sharpened at the same time the outer blades are sharpened.*
- ***Set-up.*** *To help in setting up a dado set, I make a reference stick. It's just a narrow board with several dadoes of varying width cut across it. Next to each dado, I write the number and thickness of the chipper (or shims) I used to cut the dado.*
- ***Chippers.*** *If you routinely cut dadoes using only one or two chippers, make sure not to use the same ones each time. This will help avoid uneven wear of the chippers.*
- ***Tear out.*** *To prevent tearout at the end of a dado cut, try backing up the cut with a piece of scrap stock. You can also start with an extra wide workpiece, then rip the piece down to finished width after cutting the dadoes to remove any tearout.*

is better. But this isn't necessarily true with dado blades. Since I rarely cut dadoes deeper than an inch, I find that an 8" dado set is overkill. A good 6"-dia. set will handle just about any dado you'll ever need to make, and it can be purchased for just over $100.

DADO THROAT INSERT. In addition to a blade, you'll also need a dado throat insert for your table saw. The wider opening of this insert allows for the increased width of the dado blade.

The problem with most store-bought dado inserts is that the opening is too wide. If I'm cutting narrow dadoes, I don't like having all that open space around the blade. A good solution to this problem is to make a couple of dado throat inserts with different size openings. This way, you can choose the insert to match the width of the dadoes you're cutting.

USING A DADO BLADE

Installing a dado blade on a table saw is really just like installing any other blade. But there are two points to keep in mind. First off, pay close attention when installing the two outer blades of a stack dado set. Although these blades look alike, there is actually a right-hand blade and a left-hand blade, so be careful not to switch them around (they're usually marked to tell you which side of the blade faces out).

When installing the chipper blades, you'll want to make sure the carbide teeth of one chipper don't touch the teeth of the blade next to it. Otherwise, the plates of the blades won't fit together tightly, and you'll have a difficult time adjusting the width of the dado.

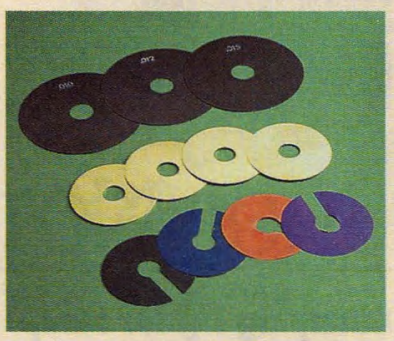
Probably the trickiest thing about setting up a dado blade is adjusting the width of the dado. With a wobble dado, you can simply rotate the hub to get the width you need (at least in theory). But there's a little more involved when it comes to adjusting a stack dado set to a precise width.

SHIMS. Adjusting the width of a stack dado set is a two-step process. To begin with, you add or remove the chipper blades as needed. But usually this only gets you into the ball park. To fine-tune the dado width, you'll need to use shims. Placing one or more shims between the chippers and the outer blades increases the overall width of the dado.

Shims are usually made of sheet brass or plastic, and their thickness is marked so that you know how many of each thickness to add. (You can also make your own shims out of paper or posterboard.)

Shimming a dado set takes a little patience. The key is to make a test cut after each adjustment to check the width of the dado. This is a lot more accurate than trying to measure the width of the dado blade itself.

One other thing about shims. I've found that when using them, they sometimes have a tendency to fall down into the threads of the saw arbor. Then when I go to tighten the arbor nut, the shims get jammed. For this reason, I like to use the new magnetic shims (see photo above). They stick to the sides of the dado blades and chippers, so you don't have to worry about them getting caught.



▲ *Magnetic shims (top row) are easy to use because they stick to the side of the blade, but brass or plastic shims will also do the trick.*

ADJUSTING THE HEIGHT. Adjusting the width of the dado is only half the battle. When cutting a dado or a groove, you're also concerned with the depth of the cut. You might think adjusting the depth of cut is simply a matter of tweaking the blade height adjustment wheel on your table saw.

But the problem I've found (especially with most contractor-type saws) is the blade raising mechanism isn't all that precise. There's typically quite a bit of play in the gears, especially when going back and forth between raising and lowering the blade. And this can make it difficult to "fine tune" the height of the blade.

To get around this, I like to start with the blade set low. Then I sneak up on the final height, raising the blade in small increments and making a test cut after each adjustment. Shop Note: If you overshoot the height when following this procedure, it's a good idea to lower the blade back down and start over again.

Once both the width and height are adjusted, you're ready to start cutting dadoes. W

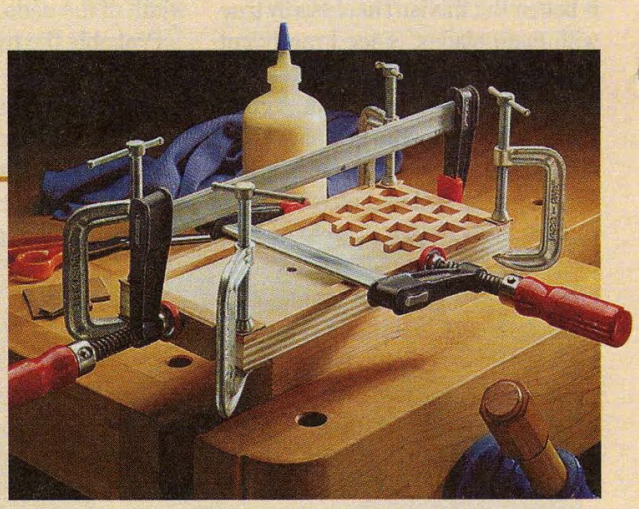
NEW STYLE DADO BLADE

The biggest problem with most stack dado sets is hassling with shims to "fine tune" the width of the dado. But recently, Freud has come out with a new stack dado set that does away with shims.

This dado set is fitted with an adjustable hub on one of the outer blades. The width of the dado is adjusted by simply turning the hub. Each "click" of the hub increases (or decreases) the width of the dado by .004", making it a lot easier to adjust the blade.

You might want to check your table saw before buying one of these blades, however. I found that because of the thickness of the hub and the length of my saw arbor, I couldn't fully thread the arbor nut when using the blade with all of its chippers.

SHOP NOTES



Clamping Jig for Lamp

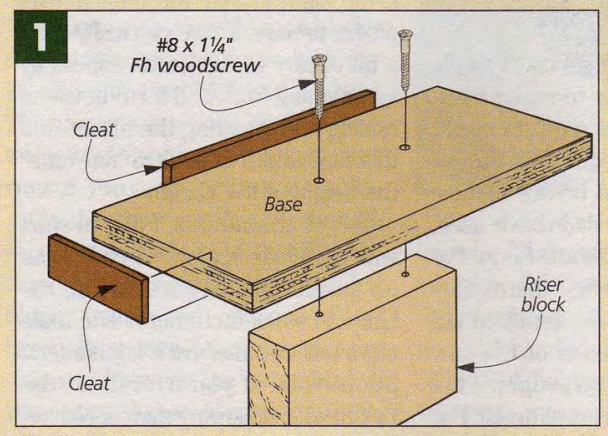
When it came to gluing up the frames that make up the sides of the lamp (see page 16), I had two concerns. First, I wanted to make sure the frames were glued up square. And second, I wanted to be able to apply clamps to the face of the half lap joints as well as the edges of the frame.

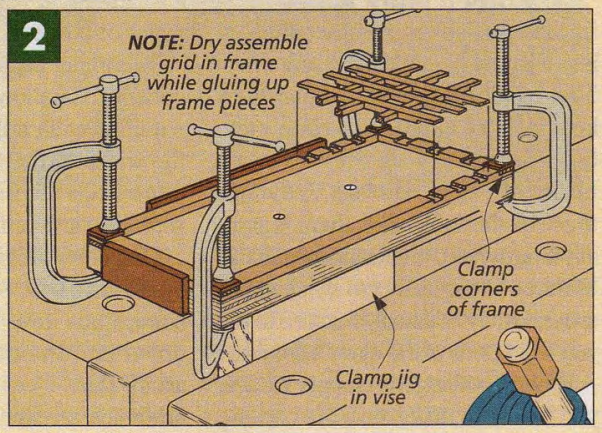
SMALL PIECES. The problem was with the size of the frame pieces. Since they're so small and thin, it's difficult to position all those clamps without damaging the workpiece. So to make things a little easier, I made a clamping jig.

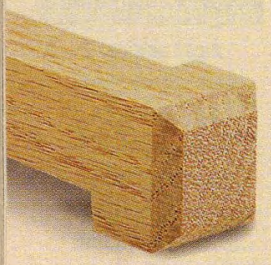
Basically, the jig is just a piece of ¾"-thick plywood, cut slightly smaller than the frames. A couple of cleats are tacked to one side and one end to create a lip to hold the frame square.

Then to help raise the jig up off the workbench so the half lap joints can be clamped, a riser block is screwed to the plywood base. This allows the jig to be clamped in a bench vise.

ASSEMBLY. To glue up the frames of the lamp, I dry assembled all the pieces first. Then I glued the four corner joints of the frame. Once these had dried, I glued the smaller pieces of the grid in place. W







Zero-Clearance Fence for Routing Chamfers

Chamfering the end of a workpiece isn't much of a problem with a router table and a chamfer bit.

But the idea of routing chamfers on the ends of the pieces of the hall tree made me a little nervous.

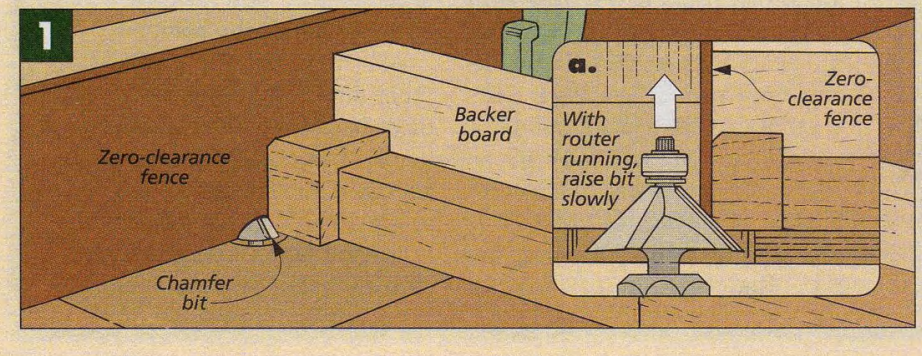
Because the ends are only 1" square, I was worried that they might get caught in the opening of my router table fence. So to play it safe, I made a zero-clearance fence to fit around the chamfer bit.

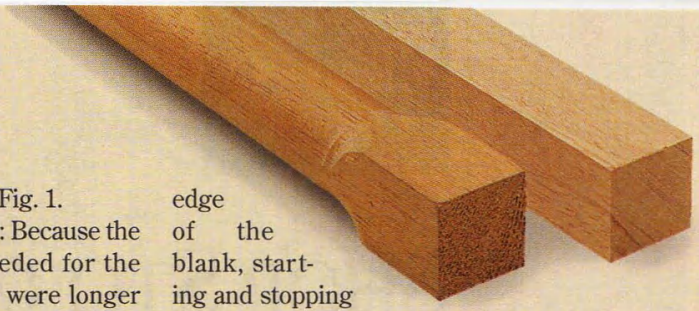
I started by lowering the chamfer bit so only the bearing was sticking above the surface of the table. Then I positioned my router table fence so it was about an ⅛" in front of the router bit bearing.

Next, I clamped a piece of ⅛"-thick hardboard to the fence, see Fig. 1. (The bearing is actually behind the hardboard fence.)

To create the zero-clearance opening, all you have to do is slowly raise the bit while the router is running, see Fig. 1a. Shop Note: Raise the bit just high enough to cut the chamfer.

Now all you have to do is rout the ends of the workpieces. Since the chamfers are being cut on end grain, it's a good idea to use a backer board to help prevent chipout. W





Making Dowels

While rounding up the materials for the serving tray (see page 6), I looked high and low for a 1"-dia. mahogany dowel. When I couldn't find one locally, I decided to make my own.

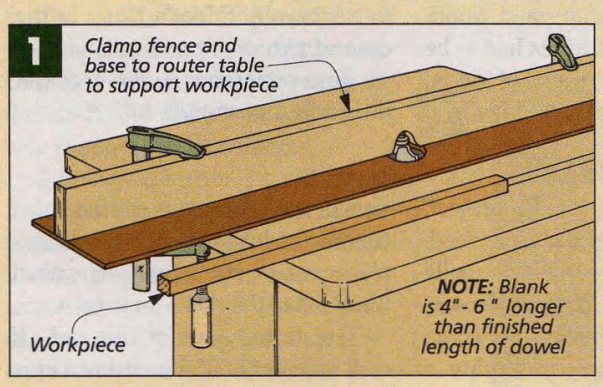
The idea behind making a dowel is pretty simple. You start with a long, straight piece of square stock and simply rout a roundover on all four edges. The only problem is that after you've routed the first three roundovers, there isn't anything for the bearing of the router bit to ride on while routing the fourth and final roundover.

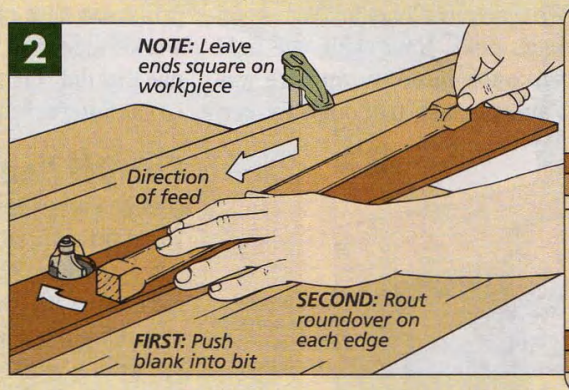
The secret is to leave the ends of the dowel blank square, and use the fence on the router table as a bearing, see Fig. 1.

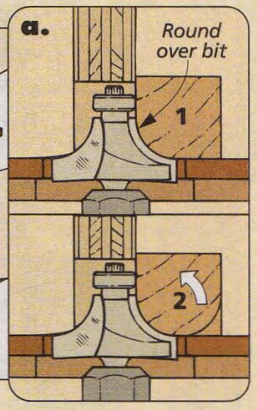
Shop Note: Because the dowels I needed for the serving tray were longer than my router table top, I had to clamp a longer support base and fence to my router table.

To make the dowel, I started with a 1"-square blank 24" long. Using a ½" roundover bit, I routed one edge of the blank, starting and stopping an inch or so short at each end, see Fig. 2.

Then I just rounded over the other three edges in the same manner. Afterwards, I cut the dowel to length and lightly sanded it to remove any burn marks. W







Cutting Tenons on Dowels

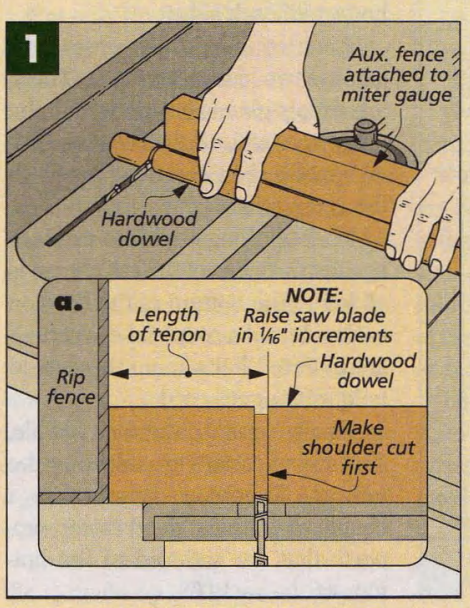
After I made the dowel for the serving tray (see above), I still had to cut round tenons on the ends. Since there were only two tenons to cut, I didn't want to go to the trouble of making a jig. So I simply used my table saw.

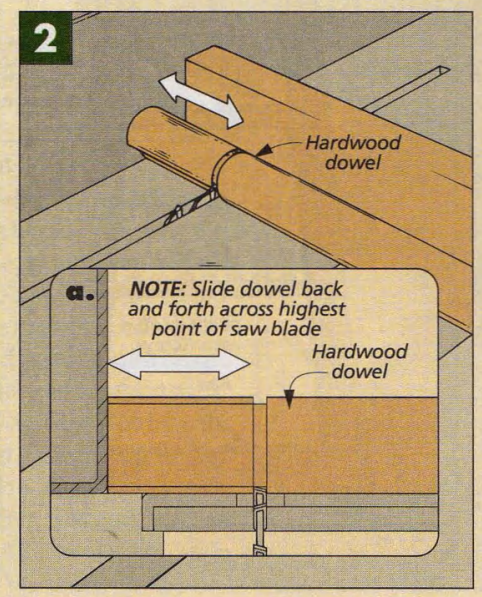
The trick is to use the saw blade to gradually "nibble" away the waste of the tenon. To do this, I started by setting my rip fence to establish the length of the tenon, see Figs. 1 and 1a. Shop Note: Make sure to measure from the *outside* of the blade to the fence.

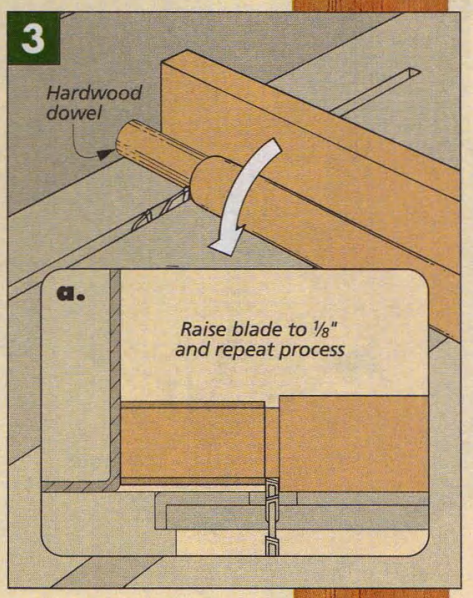
Next, I raised my blade to 1/16" and made a shoulder cut around the circumference of the dowel. This is simply a matter of holding the dowel against the rip fence and rotating it *into* the blade. An auxiliary fence attached to the miter gauge helps to support the workpiece while it's being rotated.

Next, I began "nibbling" away the waste between the shoulder and the end of the tenon by simply sliding the workpiece back and forth over the blade, rotating it slightly between each pass, see Figs. 2 and 2a.

Once I removed the waste around the entire tenon, I raised the blade another 1/16" (to a total height of ⅛") and repeated the process, see Figs. 3 and 3a. This way, I ended up with a ¾"-dia. tenon on the end of the 1"-dia. dowel. W







SHOP STORAGE CONTEST

A few issues back, we announced a shop storage contest and asked you to send in ideas and solutions to the storage problems you've faced in your shop.

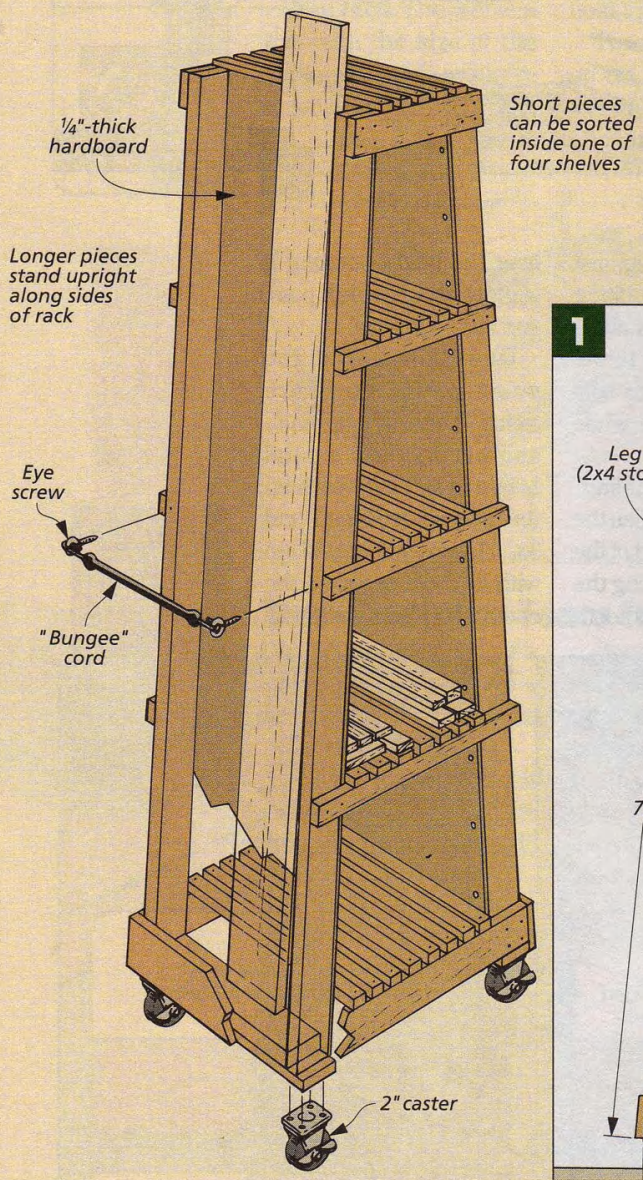
We received a lot of ingenious and unique ideas. Narrowing the field down to the three shown here was not an easy task (although we certainly enjoyed looking over all the entries). In the end, we based our decision on a few factors.

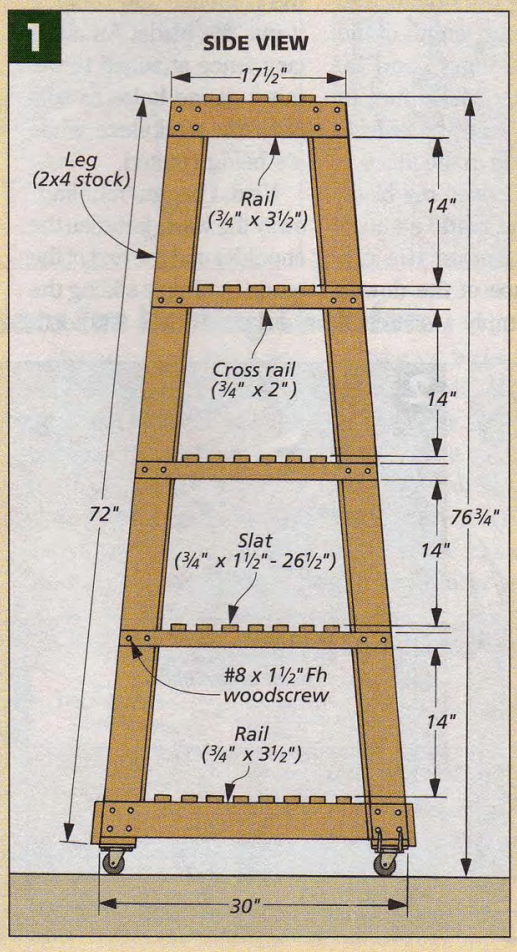
First, we were interested in solutions to common, everyday storage problems that plague most woodworkers. Second, the idea had to be one that didn't require a lot of special or hard-to-find materials. Finally, it had to be something that could be built or implemented without a great deal of effort or expense.

Congratulations to the winners, and thanks to all of you who took the time to participate. Editor's Note: In the case of two or more similar ideas, we gave preference to the one with the earliest postmark.

Cut-Off "Ladder"

Nearly everytime I build a project, I end up with some left-over wood. After a while, these scraps really start piling up. But **Reggie Brown**, of Crittenden, Kentucky has come up with a great way of storing a lot of cut-offs in a small space. He constructed a cut-off rack that resembles a ladder. The rack consists of five shelves for storing short cut-offs (under two feet), while longer pieces can be stored upright against the sides of the rack.





The framework of this cut-off rack is built out of dimensional lumber (2x4's). The shelves and cross rails are made of ¾"-thick stock while hardboard (Masonite) is used for the end panels on the sides of the rack. And to keep the joinery simple, the entire rack is assembled with glue and woodscrews, see Fig. 1.

To build the rack, start by cutting the four legs to length (72") from 2x4 stock, mitering the ends at 5°. Then a piece of ¼"-thick hardboard is screwed to each pair of legs, see drawing at left. A 2x4 cross brace is screwed in between the legs at the bottom of each side.

A series of ¾"-thick cross rails join the two sides, see Fig. 1. These are simply glued and screwed to the outer faces of the legs. Then the 1½"-wide shelf slats can be screwed to the cross rails.

To keep longer pieces in place against the sides of the rack, a rail is added to the bottom of the base on each side and a couple of eye screws are inserted halfway up the legs to hold a "bungee" cord.

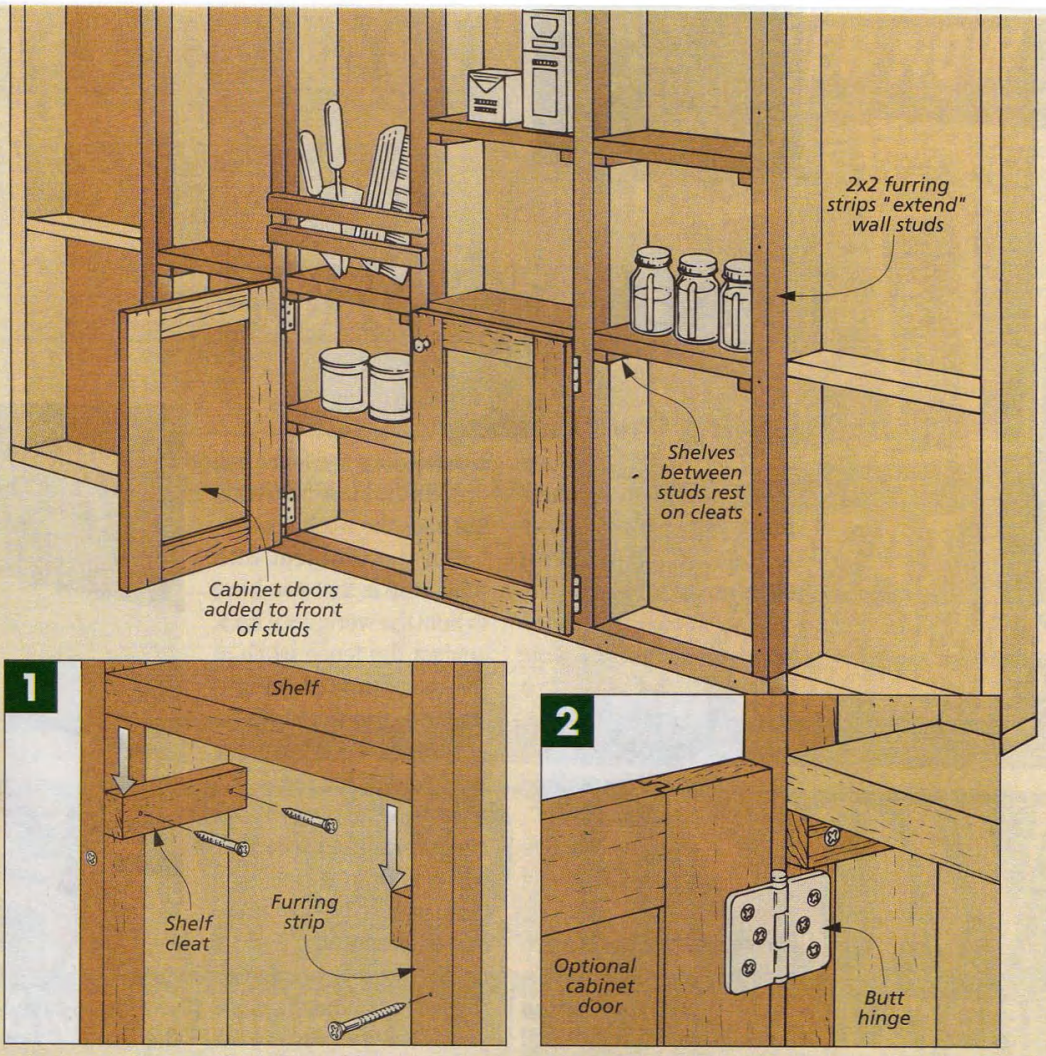
Finally, to make the rack mobile, four swivel casters are added to the bottom. These are attached to a couple of ¾"-thick wood caster supports that are screwed to the bottom of the rack. W

Wall Stud Storage

Like many woodworkers, **Danny Williams** of Lawrenceville, Georgia has a shop with unfinished (framed) walls. But instead of finishing the walls and then hanging up cabinets for storage, Danny took another approach. He built "shelves" between the open framing of the wall studs and then added doors to create storage cabinets, see drawing at right.

To create a deeper cavity for the storage cabinets, 2x2 furring strips can be screwed to the faces of the wall studs, see Fig. 1. Then cleats can be nailed or screwed to the sides of the studs and furring strips to provide support for the shelves.

The shelves are nothing more than 1½"-thick dimensional lumber cut to fit in between the wall studs. After they're fastened to the cleats, they can be left open or some simple doors can be added to help keep out dust and debris, see Fig. 2. (Shop Tip: You might try contacting kitchen remodelers in your area to see if they have any old cabinet doors available.) W



Portable Storage Bins

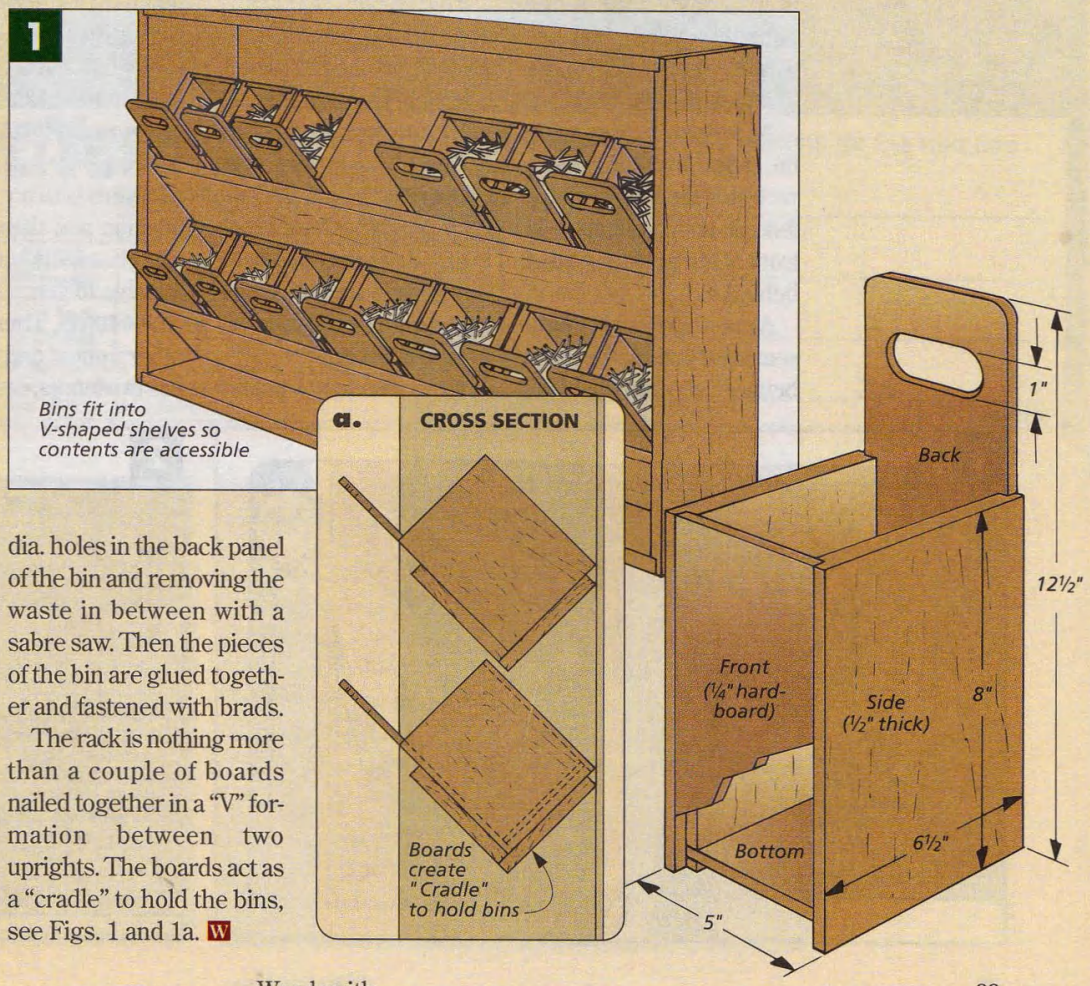
Storage for nails, screws and other small parts is another problem that nearly every woodworker faces. Although we received dozens of ideas for storage containers using just about everything imagineable, I really liked the design of these portable storage bins sent in by **Peter Coope** of North Stonington, Connecticut.

Not only do these bins hold a lot, but they're great for carrying to a jobsite. You can easily carry two in one hand by placing them back to back. And a simple rack allows you to store the bins underneath a benchtop so the contents are within easy reach. The size of the bins can be readily adjusted to suit your needs.

The front, back and bottom of each bin is made of ¼" hardboard, while the sides are made of ½"-thick solid wood (pine), see drawing at far right. Rabbets along the edges of the sides hold the front and back panels. And a groove near the bottom of each side piece holds the bottom.

Before assembling the bin, a handle is made by drilling a couple 1"-dia. holes in the back panel of the bin and removing the waste in between with a sabre saw. Then the pieces of the bin are glued together and fastened with brads.

The rack is nothing more than a couple of boards nailed together in a "V" formation between two uprights. The boards act as a "cradle" to hold the bins, see Figs. 1 and 1a. W



TALKING SHOP

Cutting Cove Molding

Q: I've just received Woodsmith No. 113, and I think you made a serious mistake in your article on cutting coves.

You show the fence placed behind the saw blade. All the books I've seen show the fence in front of the blade. This seems like a safer method than the one you show.

Warren Walters
Walnut Creek, CA

We've received several letters pointing out this "mistake" in our article on cutting coves. But the truth is we showed the fence behind the blade because we feel this is the best position (and just as safe).

As we were preparing the article on cutting coves, we tested the setup with the fence in both positions — in front of the blade as well as behind it.

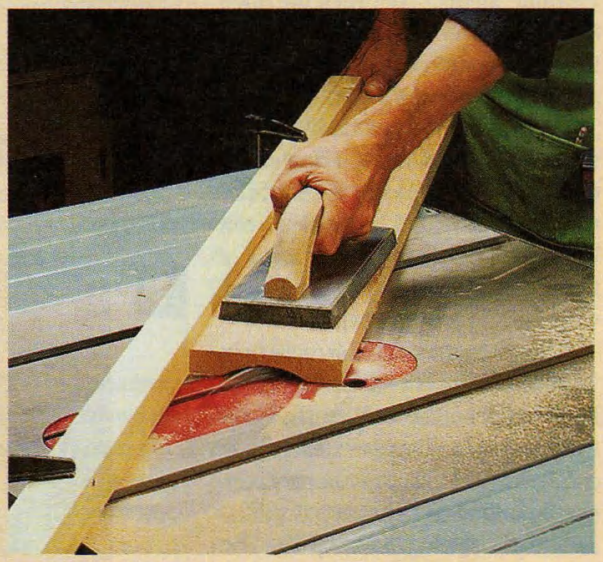
At first glance, it might seem like putting the fence between you and the blade is safer since the fence will prevent the blade from kicking back the workpiece.

But the problem with this setup is that you have to hold the workpiece back against the fence while at the same time pushing it forward over the blade.

Not only is this awkward, but I found that the workpiece has a tendency to pull away from the fence as it starts to drop off the back edge of the table saw at the end of the cut, see Fig. 1.

On the other hand, with the fence behind the blade you're only pushing in a forward direction, see Fig. 2. This is more like making an ordinary rip cut (which is probably why it seems more comfortable to me).

And since you're only raising the blade $1/16''$ for each pass, there isn't really any danger of kickback — you simply aren't removing enough material for this to be a concern.

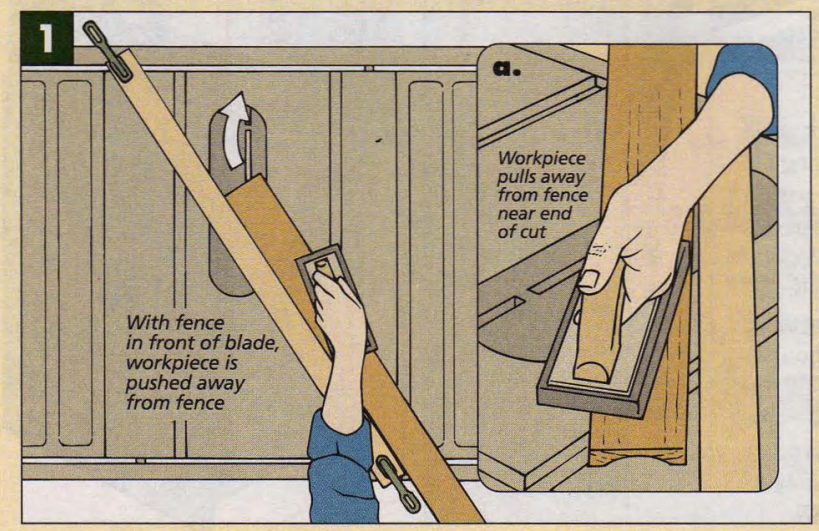


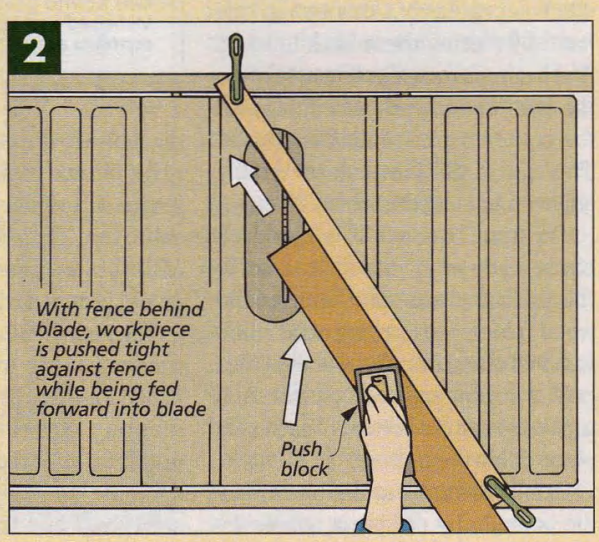
Even though I prefer putting the fence behind the blade, I wouldn't say that there is any "right" or "wrong" way. Both methods will work.

The question is which one you feel safest with. And the only way to determine this is to try out each position and then use the one that feels most comfortable to you.

TWO FENCES. There is one other option, and that is to use two fences, one on each side of the workpiece, to guide it as it's fed into the blade. This method takes a little longer since you have to set up two fences instead of just one. You also have to make sure the fences are perfectly parallel to each other to prevent the workpiece from binding.

But once you have both fences in place, you don't have to worry about holding the workpiece against the fence at all.





SOURCES

Woodsmith Project Supplies offers hardware kits and supplies for some of the projects shown in this issue. Similar supplies for these projects are also available at your local hardware store or home center.

LANTERN-BASE LAMP

To build the lantern-base lamp featured on page 16, you'll need quite a few electrical supplies that aren't normally associated with woodworking.

You might be able to find the supplies for the lamp at a hardware store. But if not, you should be able to find what you need at a lamp shop. They'll also be able to answer any questions you have about wiring the lamp, since its three-way feature is slightly unusual, refer to the box on page 21. (Or you can even have them wire it for you.)

However, if don't have a lamp shop near you, then *Woodsmith Project Supplies* has put together a kit with most of the hardware you'll need for the lamp. This lamp kit includes:

(1) Plastic Hold-down w/Nail
(1) 2 Circuit, 3 Terminal Brass Plate Switch
(1) Hickey
(1) 2" Candelabra Base
(1) 7/16" Collar
(1) 1¾"-long Nipple
(1) ½"-long Nipple
(1) 8 Ft. 18/2 Cord w/Plug
(8) #4 x ¾" Fh Woodscrews
(4) ½" Flat Cherry Plugs
(1) Rice Paper (19" x 24")

Lamp Hardware Kit
7115-100 ..... $17.95

PLEXIGLAS. When putting together the kit above, we decided not to include the Plexiglas since it can be found at a hardware store quite readily. (You need a piece of clear ⅛"-thick Plexiglas 12" x 24".)

SHADE & HARP. We tried three or four shades for our lamp and quickly found that the shape and height of the shade are an important consideration. (If the shade hangs below the top of the lamp, it's hard to reach in to turn the lights off and on.) Also, depending on your shade, you may need a harp and bracket. Again, their size will depend on the shade, so bring your lamp to the shop so you can get everything in one trip.

RICE PAPER. I should also mention that like lamp shades, you can also find a wide variety of rice paper for the base of the lamp. So you might want to check out a local art store or a good craft store to see what they have in stock.

▲ *If you're used to hinges, screws and knobs, the hardware on the lamp will take some getting used to — with names like hickeys, nipples, collars and rice paper.*

HALL TREE

The hall tree doesn't require any hardware at all. All you need are patterns for the two sets of hooks and the feet. There are patterns for these pieces on page 23. But if you would like to purchase full-size patterns, they are currently available from *Woodsmith Project Supplies*.

Hall Tree Full-Size Patterns
8005-144 ..... $3.95

WOODSMITH PROJECT SUPPLIES

If you would like to order project supplies or books from *Woodsmith Project Supplies*, please use our Toll Free order line, see below. It's open Monday through Friday, from 8 AM to 5 PM Central Time. Before calling, please have your VISA, MasterCard, or Discover Card ready.

If you would like to mail in your order, call the number below for more information concerning shipping charges as well as any applicable sales tax.

1-800-444-7527
When ordering please use Key W115

Note: Prices subject to change after April 1998

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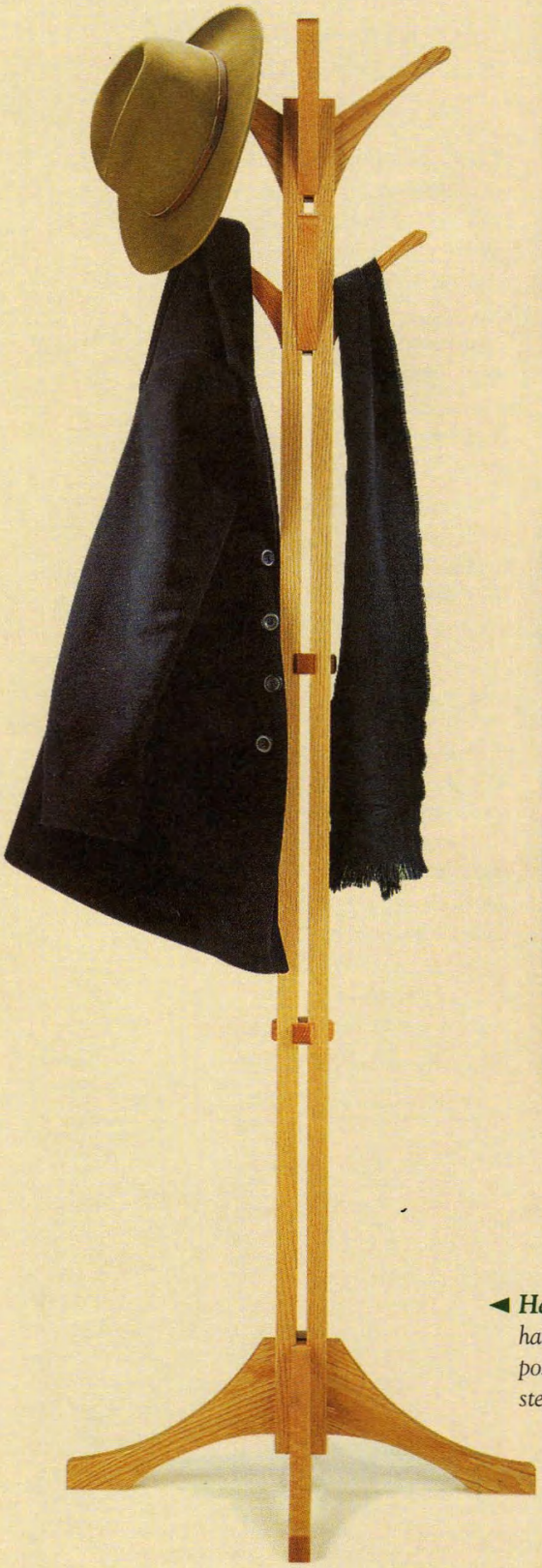
FINAL DETAILS

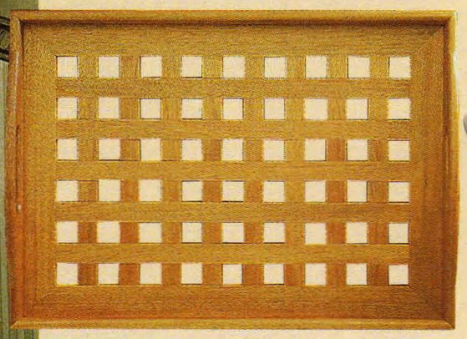


▲ ***One click.*** *The base of this lantern lamp gives off a soft warm glow.*

▲ ***Two clicks.*** *The bulb on top of the lamp lights up and brightens your room.*

▲ ***Three clicks.*** *Both bulbs are illuminated. Plans begin on page 16.*

▲ ***Serving Tray & Stand.*** *This elegant mahogany serving tray sits securely on top of an optional folding stand. For more information on building this project, see page 6.*



▲ ***Half Lap Tray.*** *The unique open gridwork of the serving tray is created with half laps. Instructions for cutting this joint begin on page 12.*

◄ ***Hall Tree.*** *The most interesting feature of this oak hall tree is its trunk. It's made up of four separate posts that sandwich the hooks and feet. Complete step-by-step plans begin on page 22.*